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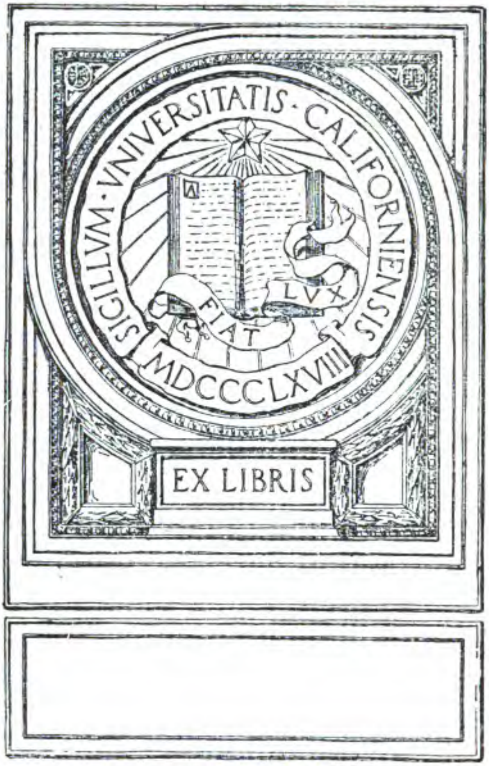

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DEPRECIATION
AND
WASTING ASSETS
AND
THEIR TREATMENT IN ASSESSING ANNUAL PROFIT AND LOSS.

BY

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"*Can the Annual Assessment of Industrial Profit and Loss be Raised to an Exact Science?*" *&c., &c.*

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INTRODUCTION.

BECAUSE it closely concerns Profit and Loss, the subject of Depreciation and Wasting Assets is of universal importance, and yet it has hitherto received little or no systematic attention. But it is evident that this neglect cannot continue indefinitely, in view of the present great and growing need for the use of reasonably accurate methods in computing annual profit and loss, for the following amongst other reasons :—

> The enormous and increasing development of joint stock and municipal trading enterprise, with the consequent passing of capital—which half a century ago was retained and managed by individual owners, or lent on specific mortgage—to the care and management of others, who are expected to uphold the value of the capital investment, and to ascertain and distribute the annual profits with due regard to the differential rights of holders of cumulative and non-cumulative, preferred, ordinary, deferred, and other classes of shares.
>
> The increasing adoption of schemes of profit-sharing co-partnership between capital and labour.
>
> The increasing burden of income taxes assessable on annual profits arising.
>
> The increasing burden of rates assessable on annual value.

TO VIMU AIMAOHLIAO

The increasing demands of labour for higher wages and other consideration, based on the declared annual profits earned by capital invested in industry and commerce.

The increasing demands for reduction in charges for the supply of municipal and other public services in the nature of monopolies, such as railways, tramways, electricity, gas, &c., based on the declared annual profits earned by the operation of such services.

No equitable adjustment is possible under any of these heads without the reasonably accurate assessment of annual profit and loss, and this can never be attained without systematic attention to the subject of Depreciation and Wasting Assets. Under these circumstances it is startling to find the general admission that the subject is in an altogether neglected and chaotic state, coupled with the further general admission that, unless a near approximation to the outlay on wasting assets which has expired within each year (depreciation) is made and fully provided for by being refunded out of the revenue receipts of the year, no correct statement of annual profit or loss can be obtained.

In the middle of the nineteenth century, when commerce was carried on by individuals, each on his own account, in a vast number of small undertakings, and there was no regular income tax, it was a matter of small moment to the individuals concerned to enquire whether in each case the surplus of receipts in or about each year, after payment of the actual cash outgoings, and allowing for difference in stock-in-trade, was wholly economic profit of the year, or whether capital outlay, previously made for the purposes of the business, had been wasted in the course of the year's operations, involving further expense and consequent reduction of the surplus by the amount of such waste before arriving at annual profit. It was sufficient for their purpose that the surplus balance of cash in each case, however large, should be available for use as and when needed.

Since that time the conditions under which commerce is carried on throughout the world have completely changed, and the great bulk of it is now controlled, not in small units each by an individual owner, but in the form of great enterprises, under the guidance of a comparatively few highly-qualified directors and managers acting as agents for a vast number of owners who themselves know nothing about the business. In these circumstances, directors and managers are obviously entitled, and expected, to seek and use the best available means for computing with reasonable accuracy the profit or loss resulting from the operations of each year. It is strange, therefore, that the subject of depreciation and wasting assets has hitherto received so little systematic attention, for it represents a large, regularly recurring, and constantly increasing part of economic cost, and it is impossible to determine the profit or loss resulting in a given period from any enterprise without first ascertaining the economic cost incurred during that period.

To call attention to the remarkable absence of any attempt to deal with depreciation in a systematic and regular manner is not to say that sufficient provision is not made in the long run, by hook or by crook, for this important part of economic cost by well-managed undertakings. But it is quite evident to any impartial observer that, even if approximately correct long-period results are obtained, the present precarious and uncertain way in which depreciation is charged to annual revenue often causes the declared annual results to oscillate violently between one year and another, although the movement of the business during the period may have had a quite regular tendency. The reason is that the charges made to revenue under the head of depreciation in a given year have little or no relation to the proportionate benefits receivable by revenue during that year from the use of the wasting assets. The subject is thus of public importance even as it affects enterprises administered in an able and honest manner, but it assumes far greater gravity in connection with that large class of undertakings which are habitually carried on under less sound and capable management.

It must also be noted that the regular treatment of Depreciation and Wasting Assets is necessary to determine with accuracy the annual cost (apart from questions of profit or loss) of producing commodities and of rendering public services, and it is thus of great importance to the internal management of industrial undertakings in all questions concerning competitive, comparative, or recurring cost, including:—

> Computing cost of production, for the purpose of fixing and grading competitive selling prices to customers.
>
> Comparing cost of production by machine and hand processes respectively.
>
> Comparing cost of out-turn of machines of different age or character.
>
> Comparing cost of successive similar factory production orders.

A principal object of this work is to show that the present neglect to account systematically year by year for expiring capital outlay made in advance on revenue account is a matter of long-established custom rather than of inevitable necessity. Accuracy cannot, of course, be attained, but a system giving results nearly approaching to accuracy by comparison with the present complete lack of method may be easily attained. The accounting for capital outlay, dedicated as such outlay always is to a certain purpose, constantly expiring, and which, rightly considered, is entirely unaffected by current market fluctuations in value, is as important as is the accounting for current cash expenditure, which is now always so minutely recorded and controlled in its thousandfold greater detail. Any class of wasting assets which is worth purchasing is worth the making of a simple accounting record each year during the period of service within which the usable value must expire. All that is needed is the use of a suitable accounting equipment, supplementary to the ordinary financial ledgers, which shall record the estimates of the engineers or other technical advisers, and enable the accountants to give due financial effect to such estimates. Such an accounting equipment would form an invaluable key to the details of the capital investment in wasting assets as shown in total in the ordinary financial ledgers.

The vital importance of the whole subject has always been insisted upon by professional accountants, and its neglect continues in spite of, and not in consequence of, their attitude. When public and official opinion demands it, the present evil can be largely remedied without encountering any insurmountable difficulties, and at a cost infinitesimal compared to the value of the benefits obtained; but, until that time arrives, professional accountants are unable to give much effective aid, as isolated action in individual cases, here and there, often presents special difficulties and disadvantages.

The problem of Depreciation and Wasting Assets is so vast and complex that it is apt to appal and discourage any sustained striving after the use of better methods. But it is clear that a great advance in the direction of improvement is easily attainable by taking thought, and some attempt is here made to set out the results of a general survey of the subject, on a basis wide enough to include every part, in the hope of assisting to influence opinion, and of attracting the attention of those best able to develop the many and widely different branches of the problem. With this object in view, the author will be greatly obliged to any interested in the subject who may be so kind as to submit suggestions and criticisms.

P. D. LEAKE.

LONDON,
13*th November*, 1911.

DEPRECIATION AND WASTING ASSETS.

CHAPTER I.

DEPRECIATION.

Definition of Depreciation.

In its true commercial sense the word "Depreciation" means fall in exchangeable value of wasting assets, computed on the basis of cost expired during the period of their use in seeking profits, increase, or other advantage. Depreciation is a part of the cost of seeking profits, equal in importance to other revenue expenditure.

Causes of fall in exchangeable value.

The fall in exchangeable value of wasting assets during the period of their use in seeking profits may be due to any one or more of the following causes:—

Expiration of time.
Natural decay.
Wear and tear.
Obsolescence.
Diminution of the mass or source of natural raw material.

Diminution of the principal sum involved in contracts such as purchased terminable annuities.

The term "profits, increase, or other advantage."

The term "profits, increase, or other advantage" includes not only all kinds of industrial and commercial profits, but it also includes the accruing interest contained in contracts such as purchased terminable annuities, and all accruing benefits (having exchangeable value) which are received in any form other than cash, such as the annual value of a house occupied by the owner, or of furniture, or horses and carriages used by the owner. As, however, private users do not usually have occasion to compute with accuracy the annual cost of their own establishments, this part of the subject is of little interest from a practical point of view.

Depreciation is unaffected by market fluctuations in value.

It is important to observe that it is the fall in exchangeable value occurring during the whole period of use, and, further, that during that period wasting assets are not primarily intended for sale in their existing form. They are, in fact, out of the market, being all the time allocated to a specific purpose in the pursuit of which they will end, except as to any scrap or remainder value which may ultimately survive. Depreciation of wasting assets is, therefore, unaffected by market fluctuations in value due to the operation of the law of supply and demand during the currency of the period of their use.

Market fluctuations must be entirely disregarded.

The omission to keep this fact clearly in mind is responsible for that part of the difficulty surrounding the subject of depreciation which arises out of day-to-day fluctuations in value due to the temporary state of supply and demand. All such fluctuations must be entirely disregarded, except always in so far as they may safely be taken as useful indications in revising earlier estimates of the ultimate exchangeable value (if any) likely to survive at the end of the period.

Stock Exchange securities and the like are not wasting assets.

The word "depreciation" in its commercial sense can apply only to wasting assets, and it will be shown later that all wasting assets must inevitably waste and pass away while applied to the purpose of seeking profits, increase, or other advantage. Stock Exchange securities and the like are not wasting assets. They may either appreciate or depreciate in value, but never in consequence of the purpose for which they are held, which is the true test of what are, and what are not, wasting assets. Realised losses on investments in Stock Exchange securities, when held for the purpose of receiving income in the form of dividends, may be clearly distinguished as "capital" losses by the application of this test. Such losses should, no doubt, be refunded or made good out of profits retained in hand for that purpose, and the same applies to any fall in the value of investments when it is considered that the loss may be permanent. But all such refunds of "capital" losses are made out of true profits arising from the undertaking, except in the case of an investment trading concern which is specifically seeking profits from the purchase and sale of investments.

The word "Depreciation" has too wide a meaning.

The word "depreciation" is unsatisfactory as a definition of that which it is intended to imply, for it means much more than is intended; thus, a fall in the value of Stock Exchange securities held by bankers and others is no doubt correctly described as depreciation in the sense opposite to appreciation. Besides being commonly used to express fall in all exchangeable value, whether existing in the form of wasting assets or otherwise, the word is also used in the sense of lowering in estimation, thus:—

> "A method . . . . . which much depreciates the esteem and value of miracles." 1646. Sir T. Browne. Pseud. Ep. IV., X., 205.
>
> "A great depreciation of the standard of morals among the people." 1829. J. Taylor. Enthus. IX., 225.
>
> "Our architectural reputation, never high, is still more depreciated by the building at South Kensington. 1862. *Fraser's Magazine*, November, 631.

The term "Expired Capital Outlay" is an exact definition of "Depreciation" in its commercial sense.

The term "Expired Capital Outlay" is an exact definition of that which the word "Depreciation" is intended to imply when used in its commercial sense, and the general adoption of this term would avoid the common mistakes arising from a natural belief that "Depreciation" covers at least all that which is opposite to appreciation.

Questions raised by legal writers.

With the aid of this definition of the word "Depreciation" various questions raised from time to time by legal writers in discussing the nature of the deductions necessary to be made from revenue receipts before arriving at profits available for payment of dividends can be readily answered. For instance, such questions as these are often asked: "Suppose I buy £100 Consols at 80, and at the expiration of a year they have fallen to 77½, is my income £2 10s. or nothing? If nothing, then if at the expiration of the year they had risen to 82½, my income would by comparative reasoning have been £5, not £2 10s. Is the result affected by the question whether at the end of the year I am, or am not, about to sell my Consols?" "Suppose a tramway company lays its line when materials and labour are both dear; both subsequently fall, and the same line can be laid for half the money, and, as an asset (independent of depreciation from wear), is worth only half what it cost. Is the company to make this good to capital before it pays a further dividend? If so, then, if the cost of materials and labour had risen after the line was laid, might not the company have divided as dividend this aggregation to capital?" Upon such a principle dividends would vary enormously, and sometimes inversely to the actual profit of the concern.

Answers to these questions.

The answer to the first series of questions is that the Consols, if owned by an individual other than a dealer, are held for the purpose of obtaining the income, and are not otherwise applied in seeking profits, and, therefore, the interest received is the true income. A loss on the actual sale of the Consols is distinguishable as a true loss of capital to the individual because it is a realised fall in the exchangeable value of that which is not a wasting asset applied to the purpose of seeking profits or increase. The answer to the second series of questions is that the tramway company must, after the tramway has been laid and equipped, disregard all subsequent fluctuations in the value of materials and labour for the reasons already given, except in so far as these may safely be taken as useful indications in revising earlier estimates of the ultimate scrap values.

CHAPTER II.

WASTING ASSETS.

Definition of Wasting Assets.

Wasting Assets consist of all forms of exchangeable value which inevitably diminish while applied to the purpose of seeking profits, increase, or advantage otherwise than by purchase and sale, and they include the following :—

(*a*) Industrial plant comprising all perishing material property other than that primarily intended for resale. Industrial plant includes, therefore, all buildings, plant, machinery, fixtures, and furniture of manufacturers; all buildings, plant, machinery, fixtures, and furniture of mines; and all surface works (reservoirs, water service, railway sidings, roads, &c.); the way, bridges, works, stations, rolling stock, and all equipment of railway and tramway companies, other than site value of land in each case. Most of the capital of electric lighting and power companies, gas, water, and omnibus companies, cable, telegraph, and telephone companies, shipping and dock companies, is also invested in perishing industrial plant, as well as that of many other undertakings. The undertakings least affected are banking, insurance, investment, and finance companies.

(*b*) The mass or source of any natural raw material, including bodies of coal and all kinds of minerals, deposits of slate, stone, gravel, earths, oil, and nitrate, also timber and all kinds of growing plants yielding recurring crops.

(*c*) Main shafts, main adits, shafts which develop ore and other underground development undertaken to win natural raw material.

(*d*) Purchased terminable annuities.
(*e*) Purchased terminable concessions.
(*f*) Leaseholds.
(*g*) Copyrights.
(*h*) Patent rights.
(*i*) Goodwill and trade marks.

Materials held for manufacture and sale are not wasting assets, neither are Stock Exchange securities.

Purchased materials and stock held for the purpose of manufacture and sale are not wasting assets, neither are gotten minerals and the like, or severed crops, for they are all held for the purpose of manufacture, or sale, and do not inevitably fall in exchangeable value during any period of use in seeking profits. Gotten minerals are easily distinguishable from the mass or source of the natural raw material, for the latter, when applied to the purpose of seeking profits, inevitably falls in exchangeable value during the period of its use in consequence of the gradual reduction of the mass, or source, as the product is won. It has been explained in the previous chapter that Stock Exchange securities and the like are not wasting assets.

Inherently wasting assets.

Wasting assets falling under the four heads (*a*) to (*d*) are inherently wasting assets, being represented by a corpus or fund (apart from the value of mere rights to future profits or increase) which wastes in the process of seeking profits. Wasting assets falling under the remaining five heads (*e*) to (*i*) are not represented by a corpus or fund apart from the value of terminable rights to future profits, increase, or advantage. This distinction is of importance, especially when considering the assessment to income tax of annual profits arising.

Wasting assets always waste while applied to the purpose of seeking profits.

All wasting assets, whether consisting of a corpus or fund which inherently wastes, heads (*a*) to (*d*), or of terminable rights to future profits, increase, or advantage, heads (*e*) to (*i*), have the common characteristic that they inevitably fall in exchangeable value while applied to the purpose of seeking profits, and unless an amount equal to this fall in exchangeable value is retained out of the revenue receipts of an undertaking by being charged to the revenue account as part of the cost, the cost will be understated. It is easy to ascertain the fall in exchangeable value which has taken place in a wasting asset at the end of the period of its efficient life, but at any time during the currency of that period this can only be estimated having regard to all known existing conditions and to probable future developments.

CHAPTER III.

FIXED AND FLOATING CAPITAL.

Distinction between amount of capital embarked, and state of capital investment.

It is necessary to distinguish clearly between the definite amount of capital embarked in a profit-seeking undertaking, and the temporary states or forms of investment in which that capital afterwards exists from day to day, and to bear in mind that the turning of some of these forms of investment into other forms of investment, or into money again, is not in any sense a reduction of the capital of the undertaking. The capital of every profit-seeking undertaking is required for two well-defined purposes: firstly, to purchase the necessary wasting assets and sometimes land (this part of the capital being often called fixed capital); and, secondly, for use in the form of other necessary assets, such as sale stock, debts, temporary investments, and cash at bank, this part being called circulating or floating capital. The whole capital outlay, however, both fixed and floating, save that on land, is constantly circulating and passing from one form of investment to another, although at very different rates of speed.

Capital can exist only in exchangeable value.

Capital can exist only in exchangeable value, and therefore capital can only be fixed by maintaining investments, in some form or other, at an exchangeable value equal to the fixed capital. As wasting assets in which capital resides become less in exchangeable value, some other form of exchangeable value arises which increases other assets, such as sale stock, debts, bank balances, or temporary investments. This must happen automatically when an undertaking results in true economic profit, provided that no greater sum than the profit is distributed; but when the undertaking results in a loss, or a sum greater than the profit is distributed, the capital cannot be maintained except by introducing fresh value.

Capital outlay is only long-period revenue outlay.

The theory that the capital and revenue outlay accounts of a profit-seeking undertaking are distinct, in the sense that the accounts relating to capital outlay can be partitioned off and treated as the capital account, is a fallacy. All capital outlay on wasting assets consists merely of payments made in advance on revenue account, all of which are constantly expiring in the service of the revenue account, and, therefore, the value of the capital investment cannot be upheld except by regular and adequate contributions, which must be retained out of revenue receipts by being charged to revenue account. These contributions need not remain lodged in the bank until the money is required to renew the wasting assets. The swelling balance at the bank should in the meantime be used, as it generally is used, if required, for the ordinary purposes of the business.

Constant interchange between fixed and floating capital.

It increases for the time being the available floating or circulating-capital, and, as the moneys representing the contributions are retained out of revenue receipts, the requirements of the business may simultaneously increase to an extent demanding the permanent use of these moneys as additional floating capital. Again, if not used to answer a growing need for further floating capital, the contributions may be gradually absorbed by the purchase of additional wasting assets, such as further plant, permanently required by the undertaking.

Capital released from wasting assets may be otherwise laid out.

In either of these cases, when it becomes necessary to renew the original wasting assets, and bring them up to their value again, the money, although specifically contributed by revenue year by year in the past, will not be found at the bank available for use. The reason is that it has been already invested to answer the growing need of the business for new capital, and, therefore, directly the money is required for its originally intended purpose, it is legitimate and necessary to permanently increase the capital of the undertaking by issuing new capital, and to use the money provided by this increase of capital to renew the original wasting assets, because the undertaking now needs a permanently larger capital, fixed and/or floating. In the meantime, sums in lieu of this new capital have been borrowed year by year, as above stated, out of the proceeds of the gradual return of the money laid out in the wasting assets which formed part of the original "fixed" capital investment.

Reduction of wasting assets is not reduction of capital.

The use of the new capital for the renewal of the original wasting assets will operate to pay back the temporary loan borrowed from the original "fixed" capital, which was properly made at a time when the money would have been otherwise unemployed in the business. Thus the operation of exchanging into other forms of value, and so gradually using up and reducing, what are called fixed assets (although really wasting assets) in the ordinary course of carrying on the business of a profit-seeking undertaking is not reducing the capital of the business, for the capital (or exchangeable value) will be found residing in some other asset received in exchange, which may be in the form of sale stock, debts, cash, plant or other value, provided always that the revenue account has been in the meantime charged with adequate sums for expired capital outlay.

Illustration of interchange between fixed and floating capital.

In order to demonstrate the continuous shifting of value taking place between the investments supposed to represent fixed capital, and the investments supposed to represent floating capital, take the case of a profit-seeking undertaking with a capital of £70,000 invested at the beginning of a period "N," in the manner shown in the columns headed "Beginning" in the *pro formâ* balance sheet set out below. In this case it must be assumed that the profits have been correctly computed during each part of the period, the revenue account having been charged with adequate sums for expired capital outlay. It must also be assumed, for simplicity, that the accrued profits have been distributed immediately prior to the termination of the middle and end parts of the period "N," except to the extent of £1,000, which was undistributed; and, further, for the sake of simplicity, it must be assumed that the wasting assets had no remainder or scrap value. It is supposed that the total depreciation for the period "N," amounting to £50,000, had been correctly forecasted and regularly provided for, on a basis of equal distribution over each part of the period as approximating most nearly to the proportion in which the beneficial use of the wasting assets, having a strictly limited economic life, was obtainable for the service of revenue. The reasons for the adoption of this basis of distribution of expired capital outlay (depreciation), in dealing with industrial plant and certain other descriptions of wasting assets, are fully considered in later chapters.

BALANCE SHEET,
Showing position of Liabilities and Assets at three different dates in the period "N."

LIABILITIES.				ASSETS.			
	Beginning.	Middle.	End.		Beginning.	Middle.	End.
	£	£	£		£	£	£
CAPITAL—				Wasting assets, which will all expire by the end of period "N"—			
"Fixed" ...	50,000	35,000	20,000				
"Floating"...	20,000	35,000	50,000				
	70,000	70,000	70,000	Lease	2,000	1,000	—
				Buildings ...	10,000	5,000	—
Debts payable	5,000	5,000	5,000	Plant and Machinery	30,000	15,000	—
Undistributed balance of profit	—	1,000	1,000	Patent rights	8,000	4,000	—
					50,000	25,000	—
				Additional plant purchased later and which will not expire by the end of period "N"...	—	10,000	20,000
				Other assets—			
				Sale stock ...	12,000	18,000	25,000
				Debts receivable... ...	12,000	20,000	27,000
				Cash	1,000	3,000	4,000
	£75,000	£76,000	£76,000		£75,000	£76,000	£76,000

At the beginning of the period, £50,000 of the capital was invested in wasting assets, and would be called fixed capital, and the remaining £20,000 was employed in the form of other assets, and would be called floating capital. By the middle of the period, it will be seen on reference to the columns headed "Middle," the unexpired value of the original wasting assets has been reduced to £25,000, and, in order to meet the requirements of a growing business during that time, additional plant (wasting assets) has been purchased, having then an unexpired value of £10,000, and, further, the amount of floating capital required has risen from £20,000 to £35,000, consisting of floating assets, £41,000, less debts payable, and undistributed profits, £6,000.

The money used to pay for the additional plant (wasting assets) purchased, and for the additional floating capital required, is together the £25,000 which has been gradually retained out of revenue to meet the expired capital outlay on the original wasting assets. The capital investment is thus upheld at £70,000, although altered in character, and now consisting of fixed capital £35,000, and floating capital £35,000. If during this time the revenue account had been charged with less than adequate sums for expired capital outlay, the capital account would have been robbed by revenue account to that extent, although this fact would not be apparent, because the value of the original wasting assets would stand overstated to that extent in the balance sheet, the balance of the floating capital assets being correspondingly reduced, or the debts payable increased, by the amount improperly paid away as dividend, assuming that this had been done.

The position at the end of the period "N" is shown in the columns headed "End" in the above balance sheet. It is assumed that the business had up to this time further increased to an extent requiring the use of additional plant (wasting assets), having a then unexpired value of £20,000, and of additional floating capital of £30,000. Both these requirements have in the meantime been financed out of the sums taken out of the revenue receipts to answer the expired capital outlay on the original wasting assets, which, at the end of the period, have fully expired in the sense of ceasing to have any value or useful existence. The fact that this would not happen to all the wasting assets simultaneously in actual practice does not in any way invalidate the principle which it is here sought to illustrate.

At the end of the period the capital investment is still fully upheld at £70,000, its original exchangeable value; but only £20,000 is at that time actually invested in the form of fixed capital, the balance of £50,000 being in the form of floating capital. Up to the last day of the period "N" the manufactured out-turn of this increasing business required the full and efficient use of the whole plant and machinery, including that which originally cost £30,000 (part of the £50,000 wasting assets), as well as that represented by the additional plant purchased during the period. The whole range of plant and machinery, both original and additional, was thus rendering efficient service up to the end of the period (for otherwise it would have been scrapped at an earlier date); but immediately after the end of the period all the original plant was put out of service and scrapped, and it is assumed the lease, buildings, and patent rights also expired at the same moment of time and required renewal.

In order, therefore, to carry on undiminished the manufacturing and other operations of the business as before, it will be necessary to have immediately available new wasting assets (lease, buildings, plant, and patent rights), and for the sake of demonstration it may be assumed that these again cost the original £50,000 to purchase. On looking at the final position at the end of the period, as disclosed in the columns headed "End" in the above balance sheet, it may seem surprising to find that, although the expired capital outlay (depreciation) has been regularly contributed out of revenue receipts, there are no sufficient cash resources available to enable the original wasting assets to be renewed.

But, as has been shown in the case illustrated, the £50,000 required for this purpose will properly be provided by an issue of new capital, which should be made at a time prior to the end of period "N" sufficient to allow of the renewal of the wasting assets to be ready for service when required. The total capital will then be £120,000, instead of £70,000, consisting of fixed capital £70,000, and floating capital £50,000. It is possible to observe, by reference to the above balance sheet, the ebb and flow which takes place between fixed and floating capital investments, although the sum of the two should never be less than the full amount of capital invested in the undertaking.

It has been assumed in the foregoing demonstration that the extent of the business *bonâ fide* increased during the period "N" from a figure represented by seven to a figure represented by twelve, and it has been shown that under these circumstances an increase in capital from £70,000 to £120,000 was necessary and proper, although the whole amount of such increase was needed to renew wasting assets purchased out of original capital. But the mere fact that the cash resources of a business are found to be insufficient to purchase new plant or other wasting assets when required, even if the sales or other receipts have increased, by no means proves that it is sound finance to make a new issue of capital to provide the necessary money.

The shortage of cash resources may be due entirely to the fact that revenue has in the meantime been allowed to consume the capital invested in wasting assets, without refunding to capital, out of the revenue receipts, the value so consumed. The value consumed would, in that case, have been inadvertently regarded as part of the profits, and would probably have been paid away to shareholders as dividend, instead of being retained, and temporarily invested, to be available to renew the wasting assets or ultimately to pay back the capital undiminished to shareholders.

Present neglect to account for capital invested in wasting assets.

How, then, are shareholders, directors, and managers to judge of the true financial position of an undertaking from the balance sheet in each particular case? The state of such assets as sale stock, book debts, and the like is always recorded in the accounts with scrupulous care. Minute written particulars are available for inspection showing the original cost and all the subsequent transactions concerning each unit, both large and small. It is thus matter of common knowledge that the "floating" part of the capital investment, as existing from time to time, has been adequately accounted for and entered in each annual balance sheet at carefully settled values, based on the known current conditions. But no detailed records of the cost and present condition of investments, such as buildings, plant, and machinery, and other wasting assets, supposed to represent fixed capital, are available for inspection and consideration, and, therefore, it is impossible to show a reasoned basis for, or to ascertain the sufficiency of, the annual refunds (if any) which have been made out of revenue receipts to capital to maintain the value of this part of the capital investment unimpaired.

And consequent impossibility of reasoned judgment on financial position of an undertaking.

To enable any sound opinion to be formed as to the financial position of an undertaking, definite information, based on known facts and latest estimates, should be available concerning the assets supposed to represent fixed capital, just as it is now available concerning the assets supposed to represent floating capital. It is, however, still customary to do without the aid of any properly developed records relating to that part of the capital investment represented by wasting assets, and, therefore, it must be admitted that it is at present impossible to form any reasoned judgment as to the true financial position of any undertaking employing wasting assets.

Co-operation needed between engineers and accountants.

The cause of this unsatisfactory state of affairs is to be found for the most part in the neglected condition of that branch of annual accounting which calls for co-operation between engineers and accountants, and which has to do with transactions combining fact (known cost—save the case of an original owner working a mass or source of natural raw material, when the value must be estimated) and long-period probability (unknown life and scrap value). It is true that the amount of the provision for annual expired capital outlay (depreciation) is small compared with the enormous volume of other transactions involving current receipt and payment of money, which are accounted for with such scrupulous care and accuracy; but, nevertheless, this necessary provision often equals or exceeds the amount of annual profit, and is therefore of vast importance.

Present haphazard methods should be superseded.

It should be explained that all original, additional, and renewal capital outlay on wasting assets, such as buildings, plant, and machinery, is at present usually recorded in one or more capital outlay accounts in the financial books, and that when annual depreciation is charged to revenue it is arbitrarily computed, either as being equal to some fixed percentage calculated on the reducing balances of these capital outlay accounts, or as being equal to a lump sum which is allocated out of the surplus balance of the annual revenue account. An alternative method used is to charge revenue haphazard with the cost of renewing wasting assets as and when this is incurred, in lieu of charging properly measured annual depreciation. All these methods are unsatisfactory, precarious, and inadequate, and it is certainly true to say that no reasoned judgment can be formed as to the justification or otherwise for an issue of new capital required by an undertaking using wasting assets, which is a very serious indictment of present accounting methods.

CHAPTER IV.

ECONOMIC COST.

Definition of Economic Cost.

It is impossible to determine the profit or loss arising in a given period out of the capital invested in any enterprise without first ascertaining the economic cost incurred during that period, exclusive only of interest on owner's capital, which interest forms part of any profit. This economic cost may be defined as "Applied exchangeable value *minus* interest on owner's capital." It is exchangeable value merged, converted, or used up in one form in seeking something of greater value in another form. In computing profit or loss for any period, the revenue account must therefore be charged with a sum equal to the exchangeable value merged, converted, or used up during that period.

Factors of Economic Cost.

In the case of any enterprise using wasting assets, this used-up value will include sums representing the exhaustion, in whole or in part, of wasting assets previously acquired and paid for. It will also include the value of materials used up, and of work or services performed, during the currency of the period, and it may include sums representing the exhaustion, in whole or in part, of wasting assets purchased before, but not paid for until after, the expiration of the period.

Economic Cost is value consumed in producing value.

The date of actual payment of cash is of no importance when computing economic cost to ascertain profit or loss, for cost incurred during a given period is not confined to the outlay for which money has then to be actually disbursed, but is the sum of exchangeable value which has passed away or been merged in pursuit of the particular object. If the sum of exchangeable value produced during any period be greater, there is a profit; if it be less, there is a loss. The words "cost," "expense," and "expenditure" are generally taken to mean something which involves an outlay of money at or about the present time, but in the economic sense they mean the amount of value consumed in securing the value produced.

Neglect of present accounting for past capital outlay unexpired.

It is clear, therefore, that cost incurred during any period has no relation to the amount of value purchased or paid for, but is the amount of value consumed during that period. While it is true to say that cost is generally regarded as being practically confined to expenses involving present money outlay, and that that part of cost is commonly carefully recorded and adequately accounted for; it is equally true to say that the other part of cost, relating to past money outlay on wasting assets, the value of which is being daily consumed in the course of carrying on the business of an undertaking, is not considered as outlay which can be systematically recorded and carefully accounted for, and, therefore, it receives little or no accounting attention.

Depreciation is as much part of Economic Cost as are wages paid.

It cannot by any means be denied that depreciation, or expired capital outlay, is as much a part of economic cost as is, for instance, the sum paid by the manufacturer for wages. The only difference between the two classes of expense is that in one the money is paid, or the exchangeable value outlaid in advance, and the objective consideration received at a later date; and, in the other, the consideration (the man's work) is received first, and the money paid immediately afterwards.

Views of economists.

The necessity for treating expired capital outlay as part of economic cost has always been insisted upon by economists; thus McCulloch, on "Political Economy," says:—

> "If the produce derived from an undertaking, after defraying the necessary outlay, be insufficient to replace the capital exhausted, a loss has been incurred; . . . if it is merely sufficient . . . there is no annual profit."

The meaning of the words "capital exhausted" used here is evidently identical with the meaning of the words "expired capital outlay." Again McCulloch says:—

> "Profits must not be confounded with the produce of industry primarily received by the capitalist. They really consist of the produce, or its value . . .

after all necessary payments have been deducted and after all the capital wasted and used in the undertaking has been replaced."

Illustration of Economic Cost.

In order to demonstrate this fact, suppose a manufacturer purchased a lease of land, and built and equipped a factory upon it, and carried on a manufacturing business over a period "N," with the result shown below:—

REVENUE ACCOUNT for the period "N."

	Dr. £		*Cr.* £
Capital outlay of money		Current receipts of money, after receiving all debts receivable ...	£1,060,000
Lease	2,000		
Buildings	10,000		
Plant and machinery	30,000		
Patent rights ...	8,000		
	50,000		
Current outlay of money, including materials, labour, and other expenses, after paying all debts payable ...	950,000		
Economic Cost ...	1,000,000		
Profit	60,000		
	£1,060,000		£1,060,000

Suppose, at the end of the period "N," the buildings and equipment were obsolete, and were taken over by the landlord to cover the cost of removal and making good. In this case it is clear the manufacturer earned a profit over the period "N" of £60,000 at a cost of £1,000,000.

Difficulty in computing yearly economic cost.

But the difficulty in computing economic cost arises largely from the fact that in practice it is necessary to divide the period "N" into parts known as years, and to estimate the profit which has accrued within each of such years. The outlay on the lease, buildings, plant, machinery, and patent rights, amounting to £50,000, is paid in advance out of capital, and called capital outlay or capital expenditure, while the cost of materials, labour, and other current expenses, amounting to £950,000, is paid for out of current receipts spread over the whole period "N."

Neglect to refund expired capital outlay out of annual revenue receipts.

Owing to the difficulty of estimating the proportion of the £50,000 capital outlay which has expired within each year of the period "N," it often happens, in estimating the annual profits of an undertaking, that no serious attempt is made to provide for that part of the cost which consists of expired capital outlay. It is sometimes ignored altogether until the value has been used up, and in other cases provision is made in a spasmodic and haphazard manner, without the use of any regular scheme for annual measurement based on properly recorded facts and latest estimates of useful life periods made in accordance with the current outlook. In the case stated it might even happen that, by the end of the period "N," the annual profits have been computed as amounting to £110,000, and have been assessed to income tax and distributed accordingly, entirely overlooking the fact that the original £50,000 invested by the manufacturer has in the meantime disappeared.

Over-statement of annual profits.

If the profits for the period "N" have been computed at £110,000 instead of at £60,000, they will have been overstated by no less than 83·3 per cent. Assuming the period "N" to be twenty years, the so computed profits would be equal to a dividend of 11 per cent. per annum on a capital of £50,000—omitting for simplicity working capital, which is not always required—whereas the actual profits are equal to a dividend of 6 per cent. per annum on that sum.

Consequent shortage of actual capital.

If the undertaking is owned by shareholders, and is to be continued after the end of the period "N," it is probable that during, or towards the end of, that time, sums would have been set aside by the Directors annually out of what would often be called "profits," and carried to the credit of an account called Reserve for renewals, or Reserve for depreciation, and shortly before the end of the period an invitation would have been issued to shareholders to take up further Preference or Ordinary Shares to provide capital which might be truly stated to be required to renew and enlarge the factory. Suppose, under these circumstances, a sum of, say, £20,000 is standing to the credit of the reserve account at the end of the period "N," being the total of the sums set aside for depreciation out of so-called "profits" during the period, this amount will be available to go towards the cost of rebuilding and equipping the new factory, provided the money has not already been absorbed in the purchase of additional fixed or floating capital assets, as already described in the chapter on "Fixed and Floating Capital."

And inflation of share capital.

And if the new equipment for the undertaking is now on a somewhat larger scale and costs £60,000, instead of the original £50,000, to renew and enlarge, the shareholders will have to add a further £40,000, instead of £10,000, to their previous investment of £50,000, and the new factory equipment and other wasting assets will then stand in the books at £90,000, made up, as to £60,000, the actual cost, and as to £30,000, the balance of expired capital outlay (depreciation) on the old factory equipment, lease, and patent rights, which should have been charged to revenue during the period "N."

Obscurity of financial position.

In the particular case stated the position of affairs would be clear enough to the directors and others having access to the books, but in actual practice the true financial position is always effectually obscured, owing to the fact that the useful life of each class and sub-division of wasting assets comes to an end at a different time, and as it becomes necessary to expend money on the renewal of each of the many different classes and sub-divisions at the end of the useful life of each, the cost of replacement is charged to capital outlay as a matter of course, without any means of first ascertaining whether all the original cost has been duly charged to revenue. It is usual to charge the whole of such renewal expense to capital outlay in the case of those undertakings which make a charge to revenue purporting to answer the unknown cost of depreciation or expired capital outlay, although the extent of this charge is itself often dependent upon the success or otherwise of each year's operations, and upon other considerations turning on the financial convenience of the moment.

Need of regular accounting for capital outlay.

Whether economic cost is at present in many cases largely understated, and if so to what extent this condition prevails, must be left to the determination of others ; but, however this may be, it is clear that the entire absence of organisation and method in recording and measuring expired capital outlay (depreciation) is an undesirable state of affairs. In unknowing or unscrupulous hands the financial evils arising out of this condition of chaos can scarcely be overstated, and the time is rapidly approaching for the general adoption and compulsory use of some suitable form of recording equipment providing a flexible scheme of measurement of annual expired capital outlay, based on recorded facts and latest estimates of useful life periods and scrap values, made from time to time and kept up to date in accordance with the current outlook.

The advantage of this compared with its cost.

A study of the subject will show that this is quite practicable, and that the administrators of any kind of enterprise may, by taking thought, develop and adapt a suitable scheme, which may be regularly used year by year with great advantage, at a cost infinitesimal compared with its value.

Payment of company dividends is not always limited by law to amount of profits.

It will be convenient here to call attention to the fact that the payment of dividends by joint stock companies is not in all cases limited by English law to the amount of economic profit earned. The legal position is clearly stated in "Buckley on the Companies Acts," ninth edition, where, in discussing Article 97 of Table "A" of the Companies (Consolidation) Act, 1908, which provides that "no dividend shall be paid otherwise than out of profits," it is stated :—

> "The profits of the business are the excess of revenue receipts over expenses properly chargeable to revenue account. As to what expenses are properly chargeable to capital and what to revenue it is necessarily impossible to lay down any general rule. For the purpose of ascertaining profit available for dividend, capital account and revenue account are to be treated as separate accounts."

These principles are not antagonistic to the economic facts discussed in this chapter if the word "expenses" be read as meaning "cost."

It has been already shown that the capital investment, in some form, must be maintained unimpaired, and so kept separate from revenue in the sense of being kept intact. But the portions of such assets as cash at bank, debts, or stock, which may for the time being represent part of the capital investment, cannot be earmarked and recorded in a separate account as capital.

Legal decision, *Lee* v. *Neuchatel.*

The decisions in the following amongst other interesting cases are quoted in "Buckley on the Companies Acts," ninth edition :—

> "In *Lee* v. *Neuchatel Company* (41 Ch. Div. 1) it was held that if the objects of the Company include the sinking of capital in the acquisition of wasting property, even depreciation by waste is not necessarily a revenue charge, but may by the regulations be thrown upon capital. . . . . If the memorandum of association provides that the object of the Company shall be to sink its capital in a wasting property and acquire profit by working that property, then the gradual diminution of the property by waste is a gradual destruction of the Company's capital, which may be within its objects legitimate. . . . it is for the shareholders to say whether or not they will put by a sinking fund to meet the waste, and the proper place to find this is in the Articles. They may, if they like, but they are not bound so to provide."

Legal decision, *Lambert* v. *Neuchatel Asphalte Company.*

> "In *Lambert* v. *Neuchatel Asphalte Company* [1882] W.M. 128; 30 W.R. 913. It was held that the Articles had given a general meeting power to declare what were net profits, and that the Court could not assume jurisdiction to determine it."

Sir Henry Buckley states :—

Legal dicta.

> "The fact is that the law is much more accurately expressed by saying that dividends cannot be paid out of capital than by saying that they can only be paid out of profits. The latter expression leads to the inference that the capital must always be kept up and be represented by assets, which if sold would produce it. This is more than the law requires. Fixed capital may be sunk and lost, and yet the excess of current receipts over current payments may be divided. But floating or circulating capital must be kept up, as otherwise it will enter into and form part of such excess (seeing that circulating capital, with the particulars of its purchase and sale, must appear in revenue account), in which case to divide such excess without deducting the capital which forms part of it will be contrary to law. (Per *Lindley, L.J.: Verner* v. *Gen. Trust* [1894] 2 Ch. 266)."

Legal doctrine protects commercial practice.

It may be said with equal truth that fixed capital should be kept up, as otherwise it will enter into and form part of the excess, for the particulars of its sale are equally included as part of the sales appearing in the revenue account, but the particulars of its cost—that is, the properly measured charge for expired capital outlay (depreciation)—are often omitted altogether from the revenue account. The legal doctrine as to the difference in the treatment of the fixed and floating assets, when the declared object of the Company is to sink its capital in wasting assets (called fixed capital), is doubtless necessary in order to protect the common commercial practice in the treatment of the accounts of collieries, mines, and other similar undertakings, where no serious attempt is made to ascertain and charge to the annual revenue account a proportionate part of the original cost of the diminishing mass of raw material. Thus the surplus balance of the annual revenue account, which is generally regarded as profit and distributed as dividend, includes, and may sometimes wholly consist of, exhausted capital outlay which has not been provided for out of revenue.

Directors are bound to make proper investigation.

The law thus allows considerable latitude when the declared object of an undertaking is to sink its capital in wasting assets; yet directors are bound to make proper investigation before recommending the declaration of a dividend, and Sir Henry Buckley further states :—

> "But if a dividend be declared without proper investigation of the financial position of the Company . . . . the burden is on the directors to show that the dividend was properly declared, and in default a director will be ordered to refund the dividend he has received (*Rance's case*, 6 Ch. 104); and if directors pay dividends out of capital, they may be liable for the whole amount so misapplied, (*National Funds Company*, 10 Ch.D. 118; *Oxford Building Society*, 35 Ch.D. 502; *Leeds Estate Company* v. *Shepherd*, 36 Ch.D. 787)."

CHAPTER V.

THE INTEREST QUESTION.

Interest question deserves careful attention

THE interest question in connection with Depreciation and Wasting Assets deserves careful consideration, and some preliminary remarks on the nature of interest may be convenient.

Nature of interest.

In theory interest is always accruing on principal, the sum of which is always increasing by the accruing interest; but in commercial practice some definite period, or rest, is adopted, at the end of which period interest at the agreed rate is computed on the principal sum outstanding at the beginning of that period and the amount of such interest is then either immediately paid off in cash, or forthwith added to the principal sum upon which interest will next be computed, and so on. In commercial practice, therefore, interest remains unproductive until it is computed at the end of each period. It is thus really in the nature of a periodical rent, charged by a lender to a borrower, for the use of money.

Importance of interest periods or rests.

The periods or rests may be of any length, but they usually cover three, six, or twelve calendar months. Commercial interest is commonly described as being at a stated rate per cent. per annum, but if the rests used cover periods either shorter or longer than one year, the expression is inaccurate unless qualified by the further words "payable quarterly" or "payable half-yearly." Thus, with half-yearly rests, interest is often described without qualification as being at a rate of, for instance, 5 per cent. per annum when it is in fact a rate of 2½ per cent. per half-year, and greater than a rate of 5 per cent. per annum, and with rests extending over two years it is less than a rate of 5 per cent. per annum. The reason is, of course, that from the time interest is either paid to the lender or added to the principal sum, it acquires productive power itself, so that if the time recurs other than once a year it varies the consideration and thus the effective rate of interest passing to the lender. This fact may assume importance where, for instance, debenture or preference stockholders are entitled to a share of the profits of an undertaking limited simply to a stated rate per cent. per annum on the par value of their holdings.

Definitions of interest. Commercial compound interest.

Interest has been variously defined as money paid for the use of money lent, or for forbearance of a debt according to a fixed ratio (rate per cent.), and it is also said that interest is the increase of an indebtedness by reason of the lapse of time, and that interest is possible only in case of the existence of a debt. Compound interest is interest upon interest, and in commercial practice it operates when an amount of interest, computed at the end of any period, is added to the principal sum, instead of being paid off in cash. Interest may be compounded in this way, either quarterly, half-yearly, yearly, or otherwise, according to the length of the period or rest used in each case, and it is then described as compound interest in commercial practice.

Proper use of interest.

As a general rule, in computing the profit or loss of an undertaking, interest should only be employed in commercial accounts when it is actually payable or actually receivable as interest. The amount of the profit or loss of an undertaking is itself the interest (increment) or discount (decrement) resulting from the capital employed. On the other hand, in computing the cost (as distinct from profit or loss) of producing commodities or other values, or of rendering public or private services, interest at a suitable rate on the capital employed is an important part of cost, and in computing annual cost must always be properly distributed as "Interest on Capital." Interest is, however, often used in commercial accounts in other ways, with results which are not always apparent, as will be seen from the illustrations set out below.

Annuity method of computing depreciation.

There are two common methods of making provision for expired capital outlay (depreciation) which involve the use of interest: one known as the annuity method, in which revenue is charged, under the head of depreciation, with equal annual sums sufficient to provide at the expiration of the estimated life of, for instance, industrial plant, an amount equal to the original cost thereof, plus interest on the capital for the time being remaining invested therein. An amount equal to that part of these annual sums which represents interest is credited in annually diminishing amounts to the revenue account, so that, taking the difference between the constant amount debited for depreciation and the diminishing amount credited to revenue each year as interest, the result is really to throw increasing annual burdens upon the revenue account as the industrial plant gets nearer to the end of its life.

Illustration of annuity method.

The effect of this method will be clearer by taking an imaginary case, in which industrial plant, having an estimated life of ten years, has cost £6,000 and is to be written off within that period on the annuity system, charging interest at 3 per cent. per annum upon the diminishing balances. In this case the constant annual sums chargeable to revenue for expired capital outlay would amount to a total, during the ten years, of £7,033 6s. 8d., and the diminishing sums which would be credited to revenue in respect of interest amount to a total of £1,033 6s. 8d.

The figures are shown below :—

	Expired capital outlay charged to Revenue.			Interest credited to Revenue.			Actual burden on the year.		
	£	s.	d.	£	s.	d.	£	s.	d.
1st year ...	703	6	8	180	0	0	523	6	8
2nd ,, ...	703	6	8	164	3	4	539	3	4
3rd ,, ...	703	6	8	148	6	8	555	0	0
4th ,, ...	703	6	8	131	13	4	571	13	4
5th ,, ...	703	6	8	114	11	8	588	15	0
6th ,, ...	703	6	8	96	13	4	606	13	4
7th ,, ...	703	6	8	78	6	8	625	0	0
8th ,, ...	703	6	8	59	3	4	644	3	4
9th ,, ...	703	6	8	40	0	0	663	6	8
10th ,, ...	703	6	8	20	8	4	682	18	4
Total ...	£7,033	6	8	£1,033	6	8	£6,000	0	0

Thus the debiting of interest to that part of the capital investment represented by industrial plant, and the crediting of this as interest to revenue, creates the necessity, as shown above, of debiting revenue with a correspondingly larger sum under the head of depreciation, and writing off this larger amount from the capital investment to offset the interest charged thereto, the operation resulting in an unfair annual distribution of the depreciation charge.

Sinking fund method of computing depreciation.

The other method of providing for depreciation involving the use of interest is that known as the sinking fund method, and to make the effect of this clearer a case may again be taken of a purchase of industrial plant which cost £6,000 and has a life of ten years, where the sinking fund method is to be applied, involving yearly instalments being taken out of the business and invested in outside securities, yielding, say, 3 per cent. Here the equal annual sums charged to the revenue amount to £523 6s. 8d., or a total for the ten years of £5,233 6s. 8d., and the total interest earned on the investments in securities outside the business amounts to £766 13s. 4d., being altogether £6,000.

Illustration of sinking fund method.

The figures are as follows :—

	Expired capital outlay charged to Revenue.			Interest from Investments.			Actual burden on the year.		
	£	s.	d.	£	s.	d.	£	s.	d.
1st year ...	523	6	8	——			523	6	8
2nd ,, ...	523	6	8	15	16	8	539	3	4
3rd ,, ...	523	6	8	31	13	4	555	0	0
4th ,, ...	523	6	8	48	6	8	571	13	4
5th ,, ...	523	6	8	65	8	4	588	15	0
6th ,, ...	523	6	8	83	6	8	606	13	4
7th ,, ...	523	6	8	101	13	4	625	0	0
8th ,, ...	523	6	8	120	16	8	644	3	4
9th ,, ...	523	6	8	140	0	0	663	6	8
10th ,, ...	523	6	8	159	11	8	682	18	4
Total ...	£5,233	6	8	£766	13	4	£6,000	0	0

By this method £766 13s. 4d., the total of the annually increasing interest from the investment of the money gradually released from the original cost of the industrial plant, is diverted from the credit of the revenue account, where it ought to appear, and is applied direct to the purpose of helping to accumulate, by the end of the economic life of the industrial plant, the sum of £6,000 (original cost), revenue account having in the meantime been charged with a less sum by £766 13s. 4d. than the actual provision which was made by the aid of this method; so that the true effect is an omission from both sides of the revenue account, under the heads of depreciation on the one side and of interest on the other side, of annually increasing sums amounting during the ten years to £766 13s. 4d.

If a record of these so omitted annually increasing sums is introduced to both sides of the revenue account, it will be found that the sinking fund method has exactly the same effect as the annuity method, for in both cases the actual burden upon revenue for the first year of the ten is £523 6s. 8d., and this increases until, for the last year of the ten, it is £682 18s. 4d. It must be remembered that in the sinking fund method the interest from investments is really received, whereas in the annuity method it is a mere fictitious entry, and, therefore, in order to get back to facts, must be cancelled by deducting it each year from the amount charged as depreciation on the debit side of the revenue account.

Comparison between annuity and sinking fund methods.

If a comparison is made between the total sum of £7,033 6s. 8d. charged as depreciation during the ten years to the revenue account under the annuity method, and the total sum of £5,233 6s. 8d. charged in like manner during the same period under the sinking fund method, it will be found that the difference of £1,800 represents a sum equal to 3 per cent. for the whole period of ten years on the £6,000 originally paid for the industrial plant; for the first-named method operates to add £1,033 6s. 8d. to the true amount of expired capital outlay (depreciation), and the last-named method operates to deduct £766 13s. 4d. from the true amount of this.

Effect of charging unexpired capital outlay with interest.

In a going concern, having the use of a definite capital, the charging of interest on that part of the capital investment represented from time to time by the unexpired capital outlay on wasting assets is nothing more than a transfer of the amount of such interest from one nominal account to another, which has very little ultimate effect, although it varies the distribution of the annual profit over the series of years. It is really a manipulation of certain heads of capital outlay and certain heads of annual revenue, within the undertaking itself, which, as between one year and another, has important effects on the balances of the capital outlay and revenue accounts respectively, but does not vary the sum of the annual computations of profit or loss extending over the whole-life period ,except to the extent of a small difference in the annual earning power of the money released each year, caused by the difference in the rate of its annual accumulation. This will be made clear by an examination of the following illustration.

Illustration of this effect.

Suppose a case in which a sum of £6,000 is invested in industrial plant having a life of ten years, and suppose the amounts of the sales and current expenses are constant in each of the ten years, the sale of the product of the industrial plant bringing in £13,000 per annum, and the current purchases of raw material, wages, and other expenses amounting to £12,000 per annum, leaving, therefore, £1,000 per annum to answer expired capital outlay (depreciation) and profit. The following figures show the difference in the revenue results as between one year and another—(*a*) charging interest at 3 per cent. on the capital investment, known as the annuity method; and (*b*) omitting interest on the capital investment. In both cases the results are equal over the whole-life period, and show a profit of £4,000 :—

	Charging interest at 3 per cent.												Omitting interest.	
	Expired capital outlay charged to revenue.			Interest credited to revenue.			Resulting annual burden on revenue.			Resulting annual profit.			Expired capital outlay charged to revenue.	Resulting annual profit.
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	£
1st year...	703	6	8	180	0	0	523	6	8	476	13	4	600	400
2nd ,, ...	703	6	8	164	3	4	539	3	4	460	16	8	600	400
3rd ,, ...	703	6	8	148	6	8	555	0	0	445	0	0	600	400
4th ,, ..	703	6	8	131	13	4	571	13	4	428	6	8	600	400
5th ,, ...	703	6	8	114	11	8	588	15	0	411	5	0	600	400
6th ,, ...	703	6	8	96	13	4	606	13	4	393	6	8	600	400
7th ,, ...	703	6	8	78	6	8	625	0	0	375	0	0	600	400
8th ,, ...	703	6	8	59	3	4	644	3	4	355	16	8	600	400
9th ,, ...	703	6	8	40	0	0	663	6	8	336	13	4	600	400
10th ,, ...	703	6	8	20	8	4	682	18	4	317	1	8	600	400
	£7,033	6	8	£1,033	6	8	£6,000	0	0	£4,000	0	0	£6,000	£4,000

In this case it is assumed that the industrial plant has done its work efficiently during the whole of its efficient life, and it is submitted that on the stated facts the true economic profit of the first year is nearer to £400 than to £476 13s 4d., and of the last year to £400 than to £317 1s. 8d.

The accumulated portion of the £6,000 which has been released to the end of each year under each of these two methods varies, and is shown below, and a column is added in each case showing interest at 3 per cent. per annum on the accumulated amount so released, as being the minimum earning power of this money to the undertaking for use in other ways. This table is inserted expressly to show the extent of the difference between the annual earning power of the varying amounts of money released under each of the two methods :—

	Charging interest at 3 per cent.						Difference in annual earning power of accumulated portion released.			Omitting interest.	
	Accumulated portion of £6,000 released (*see* Note below).			Earning power at 3 per cent. per annum.						Accumulated portion of £6,000 released (*see* Note below)	Earning power at 3 per cent. per annum
	£	s.	d.	£	s.	d.	£	s.	d.	£	£
1st year...	261	13	4	7	17	0	1	3	0	300	9
2nd ,, ...	787	18	4	23	12	9	3	7	3	900	27
3rd ,, ...	1,340	0	0	40	4	0	4	16	0	1,500	45
4th ,, ...	1,903	6	8	57	2	0	5	18	0	2,100	63
5th ,, ...	2,480	10	10	74	10	1	6	9	11	2,700	81
6th ,, ...	3.081	5	0	92	8	9	6	11	3	3,300	99
7th ,, ...	3,697	1	8	110	18	3	6	1	9	3,900	117
8th ,, ...	4,331	13	4	129	18	10	5	1	2	4,500	135
9th ,, ...	4,985	8	4	149	11	3	3	8	9	5,100	153
10th ,, ...	5,658	10	10	169	15	1	1	4	11	5,700	171
				£855	18	0	£44	2	0		£900

Note.—The amounts appearing in the columns headed "Accumulated portion of £6,000 released" allow for the fact that each periodical contribution accrued continuously over each period and not in one sum at the end of each period.

In the case of a going concern using a definite capital, the moneys retained out of revenue to answer expired capital outlay on wasting assets (depreciation) are, as a rule, immediately requisitioned either to purchase other wasting assets, thereby maintaining the volume of the "fixed" capital investment, or for use in some other form as part of the "floating" capital investment, as explained in the chapter on "Fixed and Floating Capital." If, however, the moneys are not required for either of these purposes, they will, doubtless, be temporarily invested in income-yielding securities, so that in any case they remain productive of income to the undertaking. Nothing is gained by debiting the wasting assets account and crediting revenue with interest on the moneys remaining locked up in these wasting assets. There is no good reason for charging this part of the capital investment with interest and exonerating the other part. If interest is charged on the moneys locked up in investments such as wasting assets, supposed to represent fixed capital, it should surely also be charged on the moneys locked up in investments such as sale stock and debts, supposed to represent floating capital.

In commercial accounting interest should not be charged on capital locked up in wasting assets.

The fallacy of incorporating in commercial accounts, prepared with the object of ascertaining annual profit or loss, interest on the money locked up in wasting assets may have

But interest is an important factor in computing cost of production.

originated in questions of the comparative cost of different methods of producing commodities and rendering public services. Thus, in comparing the relative advantage of a method of production necessitating the use of expensive machinery, with a method of production by hand labour, it is necessary to have regard to all the factors of cost, including, in the case of the method involving the use of machinery, both expired capital outlay (depreciation) and interest on the capital outlay. In all questions concerning the determination of cost for competitive or for comparative purposes, therefore, interest on the amount of capital outlay must always be included as part of the cost, and, as more fully explained later, in computing annual cost for this purpose, in the case of an undertaking terminating at the end of the life of the wasting assets, care should be taken that the sum of the whole-life period interest is evenly distributed over each year on the principle of average, as otherwise the annual cost, for the purpose of comparison with outside contractors' charges, will be overstated in the earlier years and understated in the later years of the period.

Diminution in capital locked up in industrial plant does not diminish the extent or efficiency of the plant.

Another cause which may have led to the practice of charging, and incorporating in commercial accounts, interest on the money remaining locked up in wasting assets—such as those used by an electric power station, for instance, which cost when new £100,000, and has an average life of forty years—may be the mistaken impression that the annual instalments of the original cost, taken back out of each year's gross revenue, which diminish the amount of capital locked up, also in some way diminish the extent of the industrial plant offered for the use of the undertaking. This is not so, for until the industrial plant becomes worn out or obsolete, which cannot be during its efficient life, each unit must do its work well, and be able to give an output not seriously diverging from the highest of which it is capable in a state of complete efficiency, and during the whole life of the industrial plant forming the equipment of this electric power station the quantity of plant remains the same as it was at the beginning of the period, for the shorter-lived classes will be duly renewed from time to time. Doubtless there is some falling-off in the efficiency of individual units as they approach the ends of their life periods, and the bearing of this is discussed later on in the chapters dealing with "Industrial Plant," but obviously each unit must render not less than efficient service during the whole of its efficient life.

Use of annuity and sinking fund methods by municipalities.

Government departments and municipalities often undertake the manufacture and supply of commodities, such as gas, water, electrical energy, and the like, and also the provision of public services, such as transport, telephones, &c., involving a large initial outlay of capital, which may be subscribed by individual members of the public or provided out of public moneys. The nature of the arrangements made for financing these undertakings varies considerably, but annuity or sinking fund methods, involving the use of interest, are often adopted, the annual instalments being sometimes brought into revenue in lieu of properly measured charges for depreciation in a way which may cause the balances of the annual revenue accounts to vary considerably from the true annual profit or loss of the undertaking. It is thus most important that the effect of these financial arrangements on the annual accounts should be clearly understood, to ensure that the accounts are correctly treated, for instalments of principal and interest are dangerous sums to handle as alternatives to properly measured charges for depreciation when it is desired to ascertain either true annual cost or true annual profit or loss of an undertaking.

Computation of annual cost in a terminating undertaking.

In view of the fact that it is sometimes necessary to compute the annual cost, apart from profit or loss, of carrying on an undertaking terminating at the end of the life of certain original wasting assets, it will be worth while to consider how, for the purpose of ascertaining annual cost, that part of the cost represented by interest on the capital employed should be distributed over each year. When the industrial plant needed for an undertaking of this kind is new, the amount of capital locked up therein is greater than it is in the later years of the period, and in ascertaining the annual cost, therefore, for the purpose of comparison with outside contractors' charges, it will be misleading to charge the earlier years with the interest on the larger amounts of capital then locked up in the industrial plant, and to charge the later years of the period with interest on the then comparatively small amounts of capital remaining invested at that time.

Interest should in such cases be charged on average capital.

The object is, of course, to compare the cost of public production of commodities or supply of services with the average cost at which similar work might be performed by outside contractors under ordinary outside conditions, and, therefore, it is necessary to bear in mind in this connection that the industrial plant of outside contractors is "aged," that is to say, has reached, and is presumably maintained in, a state of average efficiency such as would be needed for the purposes of a continuously going concern. Thus the outside 'contractors' cost is burdened only with interest on the average capital employed, and therefore for comparative purposes the annual cost of operating a terminating undertaking should be charged with annual interest on the same average basis.

Illustration of method of arriving at average capital.

In order to illustrate the method of arriving at the average capital employed in carrying on an undertaking which is to be treated as terminating at the end of the life of the original wasting assets, it will be convenient to assume the case of an electric power station involving an initial outlay of capital of, say, £75,000, made up as under :—

Land	£25,000 ...	Life period	permanent.
Plant A	£10,000 ...	„	1 year.
Plant B	£10,000 ...	„	2 years.
Plant C	£10,000 ...	„	4 „
Plant D	£10,000 ...	„	5 „
Plant E	£10,000 ...	„	10 „
	£75,000		

For the sake of simplicity scrap value of the plant is omitted.

It is required to ascertain the average amount of capital remaining invested in the undertaking over the whole period of ten years. The capital locked up in the land, £25,000, will remain the same throughout the period, for it does not waste, and, as already explained in the earlier chapters, any fluctuations in its market value during the period must be disregarded. In order to follow clearly the ebb and flow of the volume of capital locked up during the assumed life period (ten years) in the several classes of plant, with different economic life periods, it will be convenient to refer to the tabular statement set out below, which contains a column for each class of plant, showing the fluctuating amount of capital invested therein at the beginning of each of the ten years :—

STATEMENT

Showing amount of Capital locked up in each class of Plant at the beginning of each of the ten years.

Beginning of year.	A Life 1 year.	B Life 2 years	C Life 4 years.	D Life 5 years.	E Life 10 years.
	£	£	£	£	£
1	10,000÷1	10,000	10,000	10,000	10,000
2	10,000÷1	5,000 15,000÷2	7,500	8,000	9,000
3	10,000÷1	10,000	5,000	6,000	8 000
4	10,000÷1	5,000 15,000÷2	2,500 25,000÷4	4,000	7,000
5	10,000÷1	10,000	10,000	2,000 30,000÷5	6,000
6	10,000÷1	5,000 15,000÷2	7,500	10,000	5,000
7	10,000÷1	10,000	5,000	8,000	4,000
8	10,000÷1	5,000 15,000÷2	2 500 25,000÷4	6,000	3,000
9	10,000÷1	10,000	10,000	4,000	2,000
10	10,000÷1	5,000 15,000÷2	7,500	2,000 30,000÷5	1,000 55,000÷10

Uncorrected average capital locked up during the period :—

£	£	£	£	£
10,000÷1 =10,000	15,000÷2 =7,500	25,000÷4 =6,250	30,000÷5 =6,000	55,000÷10 =5,500

✓

In the above computations of average capital remaining invested in each of the different classes of plant, it will be observed that the annual contribution has been deducted at the end of each year, whereas, in order to obtain the true average, due allowance must be made for the fact that each annual contribution accrues continuously during each year, and not in one sum at the end of each year, and, therefore, the average capital employed in the undertaking is (subject to the reservation set out in the next paragraph) ascertained in the following manner :—

	Un-corrected Average.		Corrected Average.
	£		£
Land ...	25,000	... ...	25,000
Plant A	10,000	minus half of £10,000, being one year's contribution	5,000
„ B	7,500	„ „ £5,000, „	5,000
„ C	6,250	„ „ £2,500, „	5,000
„ D	6,000	„ „ £2,000, „	5,000
„ E	5,500	„ „ £1,000, „	5,000
		Average capital ...	£50,000

Short method of arriving at average capital.

In the case illustrated above it will be noticed that the economic life periods of the several classes of plant do not all terminate at the end of the assumed period of ten years, being the period covered by the useful existence of the longest-lived class of plant. The case has been stated in this form in order to call special attention to the fact that in dealing with an undertaking to be treated as terminating at the end of a certain period it is necessary that the economic life periods of all the several classes of industrial plant shall be so arranged as to end at the same time, to avoid an unprovided loss on forced realisation of any unexpired capital outlay, which in the case illustrated would be £5,000, the computed value of two years' unexhausted working capacity remaining in Plant C at the end of the ten years. Assuming the economic life periods of the different classes of plant will all terminate at the same time, the short method of ascertaining the average capital employed in a terminating undertaking is to divide by two the amount of the original capital invested in wasting assets, and add thereto the amount of capital invested in land, which remains permanent throughout the whole period.

Use of interest in dealing with cost of leasehold premises.

Although as a general rule interest should only be employed in commercial accounting when it is actually payable or actually receivable as interest, there may be exceptional cases in which its use is desirable, as, for instance, in dealing with the cost of leasehold premises, when it is sought to charge the revenue account with a sum to represent the annual value of premises occupied for trade as a basis for comparison with other similar undertakings paying an annual rental. In such a case the use of the annuity method in writing off the annual instalments of the cost of leasehold premises may be convenient. Supposing a short lease to have cost £6,000, and to cover a period of ten years, it will be seen by reference to page 47 that the annuity method will involve an annual charge to revenue of £703 6s. 8d., which is, no doubt, nearer to the true annual value of the premises than the £600 to be charged if the plan of writing off one-tenth of the cost each year were adopted. Under this annuity method interest is credited in annually diminishing amounts to the revenue account, and represents the gradually diminishing alternative profit which would have been earned by the money invested in the leasehold premises if it had been otherwise employed for the purposes of the business, and the premises had been held on an annual, instead of on a leasehold, tenancy.

Summary of conclusions.

To sum up the interest question, it is submitted that:—

(*a*) The amount of the profit or loss of an undertaking is itself the interest (increment) or discount (decrement) resulting from the capital employed.

(*b*) In computing the annual profit or loss of an undertaking, therefore, interest should only be employed in commercial accounts when it is actually payable or actually receivable as interest.

(*c*) Annuity and sinking fund methods involving the use of interest should never be used in measuring annual expired capital outlay (depreciation) on wasting assets, unless some special reason exists.

(*d*) In computing cost of production, as distinct from profit or loss, interest on the capital employed must be included as part of the cost.

(*e*) In computing annual cost of production for comparative purposes, in the case of an undertaking terminating at the end of the whole-life period of wasting assets, the sum of the whole-life period interest should be evenly distributed over each year on the principle of average.

Further arguments against the use of interest or discount in commercial accounting unless actually payable or actually receivable.

Further arguments against the use of annual interest, or annual discount, in commercial accounting, unless actually payable or actually receivable by the proprietors of an undertaking, may be stated thus:—

The argument that the capital locked up in such assets as industrial plant, leasehold property, or purchased terminable concessions must be charged, in the accounts of a commercial undertaking, with interest, because it might otherwise have been invested to produce interest, has no force, for it applies equally to the capital locked up in the other assets of a business.

Other long-period transactions which involve the locking up of capital over long and varying periods of time in such assets as goodwill, patent rights, stock-in-trade, and book debts are never subjected to interest or discount in commercial accounting.

The capital of an undertaking is provided expressly to be locked up in carrying out all and any of the legitimate transactions of the business. All transactions involve the use of more or less capital for some period of time, and, if the cost of some transactions is to be increased by having added to it annual interest on the capital locked up, then surely interest should be added to the cost of all transactions, whether extending to more or less than a year, which, obviously, would be absurd. Therefore, in commercial accounting, nothing should be done which will operate to reduce certain selected long-period transactions to the basis of annual transactions.

Any long-period transaction which is essentially in the nature of a loan, calculated with annual interest, as in the case of a purchased terminable annuity, should be treated as such in the accounts of a commercial undertaking; thus, each equal annual payment of an annuity contains both interest and capital, but in each annual payment after the first the proportion of interest becomes less, and the proportion of capital becomes correspondingly greater.

As shown in the illustrations of the effect of the annuity and sinking fund methods already given in this chapter, the use of the annuity method for providing annual depreciation operates to add to the true depreciation a fictitious sum (interest), this fictitious sum being, on the other hand, credited to the revenue accounts as interest (though it is not received) in annually decreasing amounts, the net result of these entries being to place an increasing burden of depreciation on the annual revenue accounts.

And the use of the sinking fund method for providing annual depreciation operates to deduct from the true depreciation a sum equal to the dividends which will be received from outside securities in which the annual sinking fund instalments will be invested. These dividends, being actually received, are true revenue of the undertaking, and should appear to the credit of the revenue accounts as received in annually increasing sums, involving, on the other hand, a similar annually increasing further charge to the revenue accounts under the head of depreciation, the net result being again to place an increasing burden of depreciation on the annual revenue accounts.

In the case of a long-period transaction entered into by a private individual, as, for instance, the purchase of a lease, it may be convenient to charge the transaction with annual interest on the capital remaining from time to time invested therein, by the use of the annuity method of writing off the cost. The transaction does not form part of a business having a definite amount of capital subscribed for the purpose of seeking profits by carrying out a number of transactions, of which the purchase of a lease may be one.

Thus the indiscriminate use of internal annual interest, or discount, in commercial accounting, and especially in connection with depreciation and wasting assets, is often misleading, and should be discouraged.

CHAPTER VI.

INDUSTRIAL PLANT. MEASUREMENT OF DEPRECIATION.

Industrial plant the largest division of wasting assets.

INDUSTRIAL plant represents the largest and most important division of wasting assets, and is the most difficult to deal with systematically. Industrial plant comprises all perishing material property of a profit-seeking undertaking, other than that primarily intended for resale, and it includes, therefore, all buildings, plant, machinery, fixtures, and furniture of manufacturers; all buildings, plant, machinery, fixtures, and furniture of mines; the way, bridges, works, stations, rolling stock, and all equipment of railway and tramway companies, other than site value of land in each case. Most of the capital of electric lighting and power companies, gas, water, and omnibus companies, cable, telegraph, and telephone companies, shipping and dock companies, is also invested in perishing industrial plant, as well as that of many other undertakings. The undertakings least affected are banking, insurance, investment, and finance companies.

Extent of capital outlay on industrial plant.

In order to give some idea of the enormous annual capital outlay on industrial plant, the following table, taken from the supplement to *The Economist* of the 18th February, 1911, may be useful. The figures given show the amount of fresh capital applied for by prospectus in the English market during each of the two years 1909 and 1910, connected with undertakings proposing to lay out the capital chiefly in the purchase of industrial plant:—

	1909.	1910.
	£	£
British Railways	400,000	3,715,000
Indian and Colonial Railways... ...	11,244,500	10,096,000
Foreign Railways...	30,766,700	49,974,700
Breweries and Distilleries	—	675,000
Manufacturing	4,335,900	5,086,300
Iron, Coal, Steel, and Engineering ...	2,560,100	5,409,300
Electric Lighting, Power, and Telegraphs, &c.	7,194,500	6,160,000
Tramways and Omnibus	10,510,400	4,701,000
Motor Traction and Manufacturing ..	1,511,300	368,500
Gas and Water	976,800	131,700
Docks, Harbours, and Shipping ...	1,709,500	4,600,000
Total	£71,209,700	£90,917,500

The above figures do not include the probably equally large sums of money invested during these two years in State and municipal trading enterprises, including railways, tramways, harbours, electricity, gas, water, telegraphs, and telephones, neither do they include capital invested in connection with all the many forms of private enterprise, which amounts to a very large sum, especially in England and other developed countries, but of which it is impossible to obtain any record.

Investment therein is nothing more than payments in advance on revenue account.

All capital invested in industrial plant is invested in nothing more substantial than in payments made in advance on revenue account, and the whole of such outlay, less scrap value, must ultimately come back out of revenue receipts. About this there is no room for doubt; but difference of opinion arises as to the proportion of the outlay which should be refunded each year out of annual revenue receipts during the period of the useful life of the plant.

Outlay on industrial plant compared with other advance payments.

Money invested in industrial plant, being nothing more than a payment made on revenue account in advance, may be compared with a premium paid in advance to cover, say, seven years' fire insurance. Such a payment is, in fact, sometimes made in order to secure better terms than would be obtained by paying an annual premium; and there is in such case no doubt that one-seventh of the sum paid would be properly charged to revenue account each year, until, at the end of the seventh year, the last instalment of one-seventh of the original payment would come back out of revenue receipts.

Agreement between capital outlay account in financial

In the system here proposed, it is intended that all capital outlay on industrial plant shall be recorded in the financial books in one account

books and register of industrial plant.

or group of accounts which will also be charged each year with all further outlay, whether for renewals, additions, or betterments of the plant. All such capital outlay will be analysed into classes and distributed to the class records in the register of industrial plant as fully described in the next chapter. The capital outlay account in the financial books will be credited annually, in one total, with a sum equal to the measured amount of depreciation as ascertained by means of, and deducted in detail in, the register, the profit and loss account being at the same time debited. The capital outlay account will also be credited each year with the total of the estimated scrap value of all that industrial plant which has gone out of service during each year, as shown by the register of plant, the scrap account in the financial books being debited. The balance of capital outlay on industrial plant, as brought forward in the financial books at the beginning of each year, will thus equal the totals, in the register, of the class summaries appearing in the column headed "Balance of unexpired capital outlay," so that the balance of the capital outlay account in the financial books can be exactly agreed with a list of the amounts abstracted from the class summaries in the register of plant. The scrap account in the financial books will be credited with the proceeds, or value, of scrap sold or otherwise disposed of, the balance being adjusted from time to time in respect of the differences between the estimated value of the scrap charged to the scrap account, and the actual proceeds of the sale of this. If, however, this cannot be adjusted in detail, the value of the scrap on hand at the end of each year should be estimated, and the balance of the scrap account adjusted accordingly.

Expiration of *time* is the proper basis for measuring depreciation.

In selecting the proper basis for an annual charge to revenue for depreciation, the evidence is irresistible that expiration of time is the dominating factor. The following considerations have an important bearing on the question :—

(*a*) The efficient economic life period of all industrial plant is strictly limited, although difficult to forecast. It may be compared to the period of animal life, which is not more surely limited.

(*b*) The extreme efficient economic life period of any class of industrial plant may, in a few cases, exceed one hundred years, but rarely exceeds fifty years, the most common life period being, perhaps, between ten and thirty years.

(*c*) Industrial plant has a strong tendency to fall in present value to a going concern directly in proportion to that part of its limited economic life which has expired, because the process of natural decay, and the advance of obsolescence, due to new inventions and other change, always progress, whether the plant is in actual use or not. Use, therefore, or the amount of work done by the plant, is not generally the dominating depreciation factor.

(*d*) The only exception to this rule is when the plant is of such a nature that the amount of actual wear caused by work done will obviously be the dominating depreciation factor, as with steel rails, which, if used enough, will wear out before they rust out. In cases of this kind the efficient life period should be estimated according to the expected amount of work to be done, provided that the resulting rate of depreciation never falls below the rate necessary to cover the process of natural decay and the advance of obsolescence.

These considerations suggest that the mere existence of industrial plant offers, to the undertaking owning it, a continuous opportunity of advantage which must be charged for in the revenue account, because it expires, whether it is used or not, just as the annual rent of premises must be provided because the year has expired, whether the premises have been actually used or not. It is astonishing how rarely the rate of destruction of value, due to actual use, overtakes the rate of destruction due to constant and inevitable decay and liability to obsolescence.

Cost, less scrap value, should be distributed to revenue equally over each year of the whole-life period.

In assessing annual depreciation, therefore, by far the nearest approach to accuracy will be obtained by estimating the whole-life period, in years, of each class of industrial plant, with due regard to all known facts, as well as future probabilities, and distributing the cost, less estimated scrap value, to future revenue accounts, in equal instalments over each year of that estimated whole-life period.

This secures a regular annual charge coinciding roughly with value consumed each year.

It will be found that this only means the provision, out of revenue receipts, of a fairly regular annual sum, amounting over a series of years to no more than is now taken out of the revenue receipts of any soundly managed undertaking, at irregular intervals, to pay for renewals of industrial plant at or about the time the cost of these is actually incurred. This latter is a haphazard method, frequently causing the declared net profits to oscillate violently between one year and another, although the movement of the business during the period may have had a quite regular tendency, which is a serious defect, especially when the annual profits are meagre and happen to be distributable in priorities between holders of cumulative and non-cumulative preferred, ordinary, deferred, management, and other classes of shares.

Employment of money set aside.

In the case of some undertakings it will be urged that to constantly set aside sums out of the revenue receipts each year, which may not be needed to meet expenditure on renewals for perhaps a number of years, would be most inconvenient, and would embarrass the undertaking with surplus money, which would not be properly employed, and which shareholders would be clamouring for as dividend. This would not happen in the case of most large undertakings, because considerable sums of money are required every few years for actual renewals of the different classes of plant; or, again, in the case of an increasing undertaking requiring additional plant, the money so detached from revenue would be very usefully employed in the purchase of this additional plant; but otherwise it would be necessary to invest the surplus moneys in safe securities, and to be content with the interest earned thereon.

Increase in cost of repairs in later years.

Objection is sometimes taken to the principle of writing off the cost of industrial plant in equal annual instalments on the ground that the cost of repairs, to each particular unit of plant, becomes heavier as the age of each unit increases year by year, and therefore it is said that the provision for depreciation of plant should be greater in the earlier years and less in the later years. In an "aged" plant, however, the cost of repairs will be found to average year by year in a remarkable way, as there are always units of plant in all stages of the useful life period, and, apart from the cost of important renewals of parts, such as the boilers of a steamship, for instance, which should be treated as capital outlay and recorded in the register of plant as a separate class, the outlay on repairs, although it may be large in the aggregate, consists of a vast number of comparatively small items, which naturally tend to average. It must also be borne in mind that a new plant—that is, a plant which is not "aged"—rarely gives its full output, and generally requires special attention and adjustment, the cost of which is a set-off against the cost of repairs required at a later period. Thus, the argument based on the increased cost of repairs in later years has little or no weight, although it is often used by those who still uphold the method of measuring depreciation on the reducing balance of cost basis. It is thought that an examination of the effect of this method, as hereafter illustrated in this chapter, will show its utter unsuitability and how little way such an argument goes to justify its retention.

The use of existing industrial plant cannot be deferred with impunity.

On the other hand, an exactly opposite argument is often used to the effect that if industrial plant has been well maintained out of revenue and is working, perhaps, even more smoothly at the end than at the beginning of the first year of its life, no specific charge for depreciation need be made to the revenue account of that first year; but this view is unsound. And further, the use of existing industrial plant cannot even be deferred with impunity, because, as already stated, the process of natural decay, and the advance of obsolescence, always progress, and for this reason existing industrial plant must be paid for every year, whether used or not.

Treatment should be similar, whether life be one or more years.

If the efficient life of any class of industrial plant began and ended within a period of one year, instead of extending over a longer period, no one would be found to suggest that the cost of the industrial plant was not a necessary charge to the revenue account of that year, and the fact that this outlay on revenue account does not all expire within an exact accounting period of one year is no reason for neglecting to refund out of the year's revenue receipts the year's expired portion of the outlay. A year is nothing but an arbitrary division of time, at the end of which it is usual to compute trading results.

Depreciation provision is not for future renewals, but for past capital outlay expired.

It is a common custom to describe the annual provision for depreciation of industrial plant as a provision for future renewals, as though it has reference to the future; but this is surely a misconception. The annual provision for depreciation has nothing to do with the future but relates solely to the past. It is a replacement of capital in respect of past capital outlay expired in the process of carrying on the business, and is not less an expense than other expenditure of a current character, such as operative wages. It is an expenditure of exchangeable value incurred daily, and must be provided for with other working charges, although the exchangeable value so expended has been acquired and paid for at an earlier date out of moneys provided as capital.

Depreciation is fall in exchangeable value over whole period of use, and is unaffected by fluctuations in market prices.

It has been shown that depreciation is the fall in exchangeable value of industrial plant computed on the basis of cost expired during the period of its use in seeking profits, and that this fall is due to natural decay, wear and tear, and obsolescence, and to all or any of these causes. It has also been shown that it is the fall in exchangeable value occurring during the whole period of use, this being equal to the difference between the original capital outlay and the ultimately realised scrap or remainder value. Depreciation of industrial plant is therefore accurately defined by the term "expired capital outlay," being wholly unaffected by fluctuations in the market price of similar property during the period of its use.

Principal difficulty arises from need of making provision year by year during period of use.

The principal difficulty in dealing with the question of depreciation arises from the fact that it must be assessed year by year during the period of the use of the industrial plant, and, therefore, must necessarily be estimated. To ensure absolute accuracy it would be necessary to know with certainty not only the amount of the original cost, but also the length of the useful life period, and the amount of the ultimate scrap or remainder value. But the first only of these three factors is known with certainty during the currency of the life period, and therefore the other two factors must be estimated, and the estimates revised from time to time if necessary.

And suitable accounting equipment is required for this.

Thus, in order to ensure that the capital outlay represented by the cost of industrial plant is currently accounted for as it expires year by year, it is necessary to provide, as part of the regular accounting equipment of an undertaking using industrial plant, some suitable means of recording details of the industrial plant, including the cost—which is the known factor—and estimates of the useful life period, and of the ultimate scrap value—which are the two unknown factors. If these records be in suitable form it will be a simple matter for the accountant to distribute equitably over each year the proper proportion of the whole-period depreciation, always making the distribution of the remaining balance of cost with due regard to the latest estimates affecting the two unknown factors, which must be revised whenever current knowledge and experience show that revision is needed. Such revision can be easily made, as shown in the next chapter, although it may not often be required.

Annuity and sinking fund methods are unsuitable.

It has already been shown in the chapter on "The Interest Question" that annuity and sinking fund methods, involving the use of interest or discount, should not be used in measuring annual depreciation. It is there demonstrated that such methods result in an unfair annual distribution over the period, for the reason that the depreciation charges fall upon each year in an increasing ratio, and do not coincide, even approximately, with the proportion of consideration obtainable from the industrial plant during each year of its efficient economic life, which tends downwards.

Original cost basis is most suitable.

The following tabular statement is intended to demonstrate that the "original cost basis" of distributing annual depreciation charges is the most suitable for common use, because the distribution will coincide approximately with the value of the services rendered each year by the industrial plant. For comparative purposes a column has been added showing the annual distribution on the "reducing balance of cost basis," and this shows in graphic form the widely different results of the two methods. The cost of the industrial plant is assumed to be £100, the life ten years, and the scrap value £5.

	Estimated proportion in which the total output is receivable each year.	Original cost basis.	Divergence from output.	Reducing balance of cost basis.	Divergence from output.
	Units.	£		£	
1st year ..	10	9·5	— ·5	25·0	+ 15·0
2nd " ...	11	9·5	— 1·5	18·8	+ 7·8
3rd " ...	11	9·5	— 1·5	14·2	+ 3·2
4th " ...	11	9·5	— 1·5	10·6	— ·4
5th " ...	10	9·5	— ·5	7·9	— 2·1
6th " ...	10	9·5	— ·5	5·9	— 4·1
7th " ...	9	9·5	+ ·5	4·6	— 4·4
8th " ...	8	9·5	+ 1·5	3·4	— 4·6
9th " ...	8	9·5	+ 1·5	2·6	— 5·4
10th " ...	7	9·5	+ 2·5	2·0	— 5·0
	Total output in units 95	Usable value 95 Scrap value 5	12	Usable value 95 Scrap value 5	52
		£100		£100	

Industrial plant must be capable of efficient work during efficient life.

Industrial plant is, of course, expected to do its work well, and to give an output not seriously diverging from the highest of which it is capable in a state of complete efficiency, and when, as in the case shown above, the annual output falls from a quantity represented by the figure eleven, to anything like a quantity represented by the figure seven, being a decrease of upwards of 36 per cent. from the highest, it is likely the industrial plant will be scrapped and sold for a sum not exceeding five per cent. of its cost. ✓

Proportion in which whole output is receivable period by period.

It is submitted that the first column in the above tabular statement shows approximately the widest variations in which the whole-life output, or usefulness, of industrial plant is likely to be receivable, period by period, during its efficient life. It is generally admitted that the whole-period depreciation of any class of industrial plant should be distributed to annual revenue in proportions which will coincide, as nearly as possible, with the proportionate benefit obtainable from the plant during each year of its limited economic life, and it is, therefore, of the utmost importance to determine what this proportionate benefit is. It is suggested that the figures in the first column show a width of variation between the beneficial output of one period and another never likely to be exceeded in ordinary cases. The suggested equal annual distribution of depreciation charges is based upon this assumption, that the difference in the yearly output obtainable from any kind of industrial plant is never greater than the curve represented by the variation in the figures shown in the first column above. This curve will be less abrupt whenever the whole-life period is twenty, thirty, fifty, or any number of years above ten, and it will be observed that even the curve shown does not at any point vary very widely from the straight line which coincides with an equal annual output.*

Reducing balance of cost basis is unsuitable and misleading.

The above tabular statement shows that the reducing balance of cost basis is unsuitable for measuring the annual charge for depreciation.

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* **Note.—*See* also the first Table in the Appendix, page 186.**

It will be seen that on this basis the sum of the errors in annual distribution over the whole-life period is as much as fifty-two in ninety-five, whereas, on the original cost basis, it is only twelve in ninety-five; and, further, on the reducing balance of cost basis, the charge for the first year is 150 per cent. more than the year's receivable proportion of the total output, and for the last year it is 65 per cent. less than this, against 5 per cent. less for the first year, and 35 per cent. more for the last year, on the original cost basis.

Reducing balance of cost basis takes excessive time at ordinary rates.

It is sometimes roughly assumed that, in writing off depreciation on the reducing balance of cost basis, a rate of 5 per cent. is sufficient if the whole-life period of the plant is twenty years, or a rate of 10 per cent. if the whole-life period is ten years, and so on; but this is not so, as will be seen by reference to the tables which will be found in the Appendix:—

Table showing amount of depreciation per cent. of original cost written off in each year on the reducing balance of cost basis, at various rates between 3 per cent. and 33⅓ per cent.

Table showing surviving value per cent. of original cost remaining at the end of each year when depreciation is written off on the reducing balance of cost basis, at various rates between 3 per cent. and 33⅓ per cent.

The last-mentioned table shows that it takes about fifty-eight years to write off the cost of plant having a scrap value of 5 per cent., if a rate of 5 per cent. on the reducing balance of cost be employed, and that it takes about twenty-eight years if a rate of 10 per cent. be employed.

Rates needed to operate within the limits of ordinary life periods.

The actual rates needed to write off the cost of plant having a scrap value of about 5 per cent., if calculated on the reducing balance of cost, are, as shown by the last-mentioned table, as follows:—

Life in years.	Rate per cent. required on reducing balance of cost basis.	Life in years.	Rate per cent. required on reducing balance of cost basis.
100	3	30	9½
84	3½	28	10
72	4	27	10½
65	4½	26	11
58	5	25	11½
53	5½	23	12
48	6	22	12½
44	6½	18	15
41	7	13	20
38	7½	10	25
36	8	8	30
34	8½	7	33⅓
32	9		

Effect of employing reducing balance of cost basis at ordinary rates.

To understand the true effect of computing depreciation on the reducing balance of cost at rates ordinarily used, suppose a gas company buys one hundred new meters each year at a cost of £1 each, being an annual expenditure of £100 on new meters, and suppose the meters have an efficient life of ten years, the unexpired capital outlay on meters never in fact rises above £450, as is seen in the following table:—

End of year.	Annual capital outlay.	Annual Depreciation.	Balance of unexpired capital outlay.
	£	£ £	£
1909	100	10 per cent. on 100 = 10	90
1910	100	,, ,, 200 = 20	170
1911	100	,, ,, 300 = 30	240
1912	100	,, ,, 400 = 40	300
1913	100	,, ,, 500 = 50	350
1914	100	,, ,, 600 = 60	390
1915	100	,, ,, 700 = 70	420
1916	100	,, ,, 800 = 80	440
1917	100	,, ,, 900 = 90	450
1918	100	,, ,, 1,000 = 100	450
1919	100	,, ,, 1,000 = 100	450
1920	100	,, ,, 1,000 = 100	450

But, by computing depreciation at 10 per cent. on the reducing balance of cost, the annual amount of depreciation will not rise, as it ought, to the sum of £100 by the end of the tenth year, or until the end of a period of about forty years, by which time the balance of the capital outlay account will have accumulated to nearly £1,000, being more than double the true unexpired capital outlay. This is clearly seen in the following table:—

DEPRECIATION ON THE REDUCING BALANCE OF COST.

Illustration of reducing balance of cost basis.

The figures with the + prefix represent the annual expenditure on new meters, and the figures with the — prefix represent the annual depreciation, calculated at 10 per cent., on the reducing balance of cost.

	100		687		892		963
1909 ...	— 10	1919 ...	— 69	1929 ...	— 89	1939 ...	— 96
	90		618		803		867
	+ 100		+ 100		+ 100		+ 100
	190		718		903		967
1910 ...	— 19	1920 ...	— 71	1930 ...	— 90	1940 ...	— 97
	171		647		813		870
	+ 100		+ 100		+ 100		+ 100
	271		747		913		970
1911 ...	— 27	1921 ...	— 75	1931 ...	— 91	1941 ...	— 97
	244		672		822		873
	+ 100		+ 100		+ 100		+ 100
	344		772		922		973
1912 ...	— 34	1922 ...	— 77	1932 ...	— 92	1942 ...	— 97
	310		695		830		876
	+ 100		+ 100		+ 100		+ 100
	410		795		930		976
1913 ...	— 41	1923 ...	— 79	1933 ...	— 93	1943 ...	— 98
	369		716		837		878
	+ 100		+ 100		+ 100		+ 100
	469		816		937		978
1914 ...	— 47	1924 ...	— 82	1934 ...	— 94	1944 ...	— 98
	422		734		843		880
	+ 100		+ 100		+ 100		+ 100
	522		834		943		980
1915 ...	— 52	1925 ...	— 83	1935 ...	— 94	1945 ...	— 98
	470		751		849		882
	+ 100		+ 100		+ 100		+ 100
	570		851		949		982
1916 ...	— 57	1926 ...	— 85	1936 ...	— 95	1946 ...	— 98
	513		766		854		884
	+ 100		+ 100		+ 100		+ 100
	613		866		954		984
1917 ...	— 61	1927 ...	— 86	1937 ...	— 95	1947 ...	— 98
	552		780		859		886
	+ 100		+ 100		+ 100		+ 100
	652		880		959		986
1918 ...	— 65	1928 ...	— 88	1938 ...	— 96	1948 ...	— 99
	587		792		863		887
	+ 100		+ 100		+ 100		+ 100
	687		892		963		987

Disadvantages of reducing balance of cost basis.

The disadvantages, then, of writing off depreciation on the reducing balance of cost basis include the following :—

> When a rate sufficiently high to extinguish the cost at the end of the estimated whole-life period is employed, it throws an abnormally heavy burden on the earlier years and an altogether inadequate charge on the later years of the period.
>
> When, as usually happens, the rate employed is too low to extinguish the cost at the end of the estimated whole-life period, the annual depreciation is systematically understated, and the amount so understated each year remains to the debit of the capital outlay account in the books of the undertaking, which will thus be systematically overstated, and will gradually accumulate to an amount which, in combination with the rate employed, provides an annual sum equal to the true annual depreciation.

In the case of the gas company's meters, referred to above, the capital outlay account would continue to accumulate until it reached £1,000, although the unexpired capital outlay on the meters never, in fact, rises above £450.

Simple *versus* complicated methods of measuring depreciation.

The simple method of measuring depreciation by keeping suitable accounting records and regularly distributing the cost, less scrap value, equally over each year of the estimated whole-life period of each class of industrial plant, is in striking contrast to the complicated methods which are sometimes recommended ; thus, it has recently been suggested in a well-known scientific journal that the conditions controlling the rate of depreciation are all represented by various well-known curves, including—

The vertical parabola,
The logarithmic curve,
The ellipse,
The horizontal parabola,
The cubic parabola,

and on this assumption it is seriously argued that, as possibly no single curve represents the manner in which depreciation actually occurs, the problem should be solved by the adoption of several curves. It is obvious that such methods, even if practicable, would give no useful results ; whereas approximately accurate results can be easily obtained by simple means with the aid of a properly developed system of accounting record, requiring comparatively little labour, and no more skill to maintain than that which has always been ungrudgingly devoted to the record of the thousandfold greater detail connected with all the many forms of commercial cash and credit transactions.

Financial evils encouraged by present neglect of the subject.

The following extract from a letter, addressed to the author some years ago, by an experienced railway manager abroad, gives an entertaining account of the possibilities of unchecked enterprise :—

> "In this country scarcely any of our railway companies have reached such a stage as to be able to give consideration to the matter of depreciation in any form. Such a thing as writing off from any account, except profit and loss, is practically unknown. The process is about as follows: A railway that should properly cost, say, £2,000,000, is built at a cost of, say, not to exceed £500,000. Of course, it is not built, in fact it is not completed in any particular. The right-of-way is only partially secured and generally too narrow, the road-bed is always built too narrow, ballasting is lost sight of entirely, except with such material as may be along the side of the road-bed. The sleepers are small and generally of inferior material, rails are light, fences poor, and the railway carriages and wagons are of the cheapest kind, but made to look well on the outside.
>
> "Buildings are generally of wood, except, perhaps, where offices of the company which are made quite up to date of brick or stone and elaborately furnished. In consequence of the above state of affairs, almost immediately that operation is begun additional right-of-way must be

purchased, road-bed, ties, and rails strengthened, new machinery purchased &c., all of which must necessarily be charged to capital account, and in this way the operation is kept down below what it really should be.

"In most cases, but not always, the entire cost of new work is charged to capital account, although it may take the place of repairs. Hence it is that usually more money must be found, and the road is burdened with fixed charges which it cannot pay. Mortgages are foreclosed, and the property is sold for much less than it cost, and a reorganisation takes place, the bondholders being the losers, although they may have purchased the bonds at a considerable discount, and have had a donation of capital stock thrown in. This reorganisation comes about three or four times before the road is completed, and even in such cases very few managers know anything about charging off for depreciation.

"It seems to me that your plan for handling the accounts, and letting each particular kind of property stand its own depreciation, is most excellent, but it would be useless at the present time to undertake to inaugurate any accounting of this kind in this country.

"The fact of the matter is that directors would not tolerate it, as it would show up the truth, namely, that somebody, generally foreigners, had been buncoed into buying securities that were really not worth more than 40 to 50 per cent. of what they paid for them. While it is a fact that such a plan might tend to prevent inequities occurring, as between different classes of shareholders, at the same time let me tell you that in this country shareholders know very little, and care much less, about what is going on, simply because they are not, in fact, shareholders as a rule, but only the holders of certificates of little or no value.

"I believe that your plan would work excellently where there was honest intention."

Suggested statutory register of plant for the measurement of depreciation.

The method of keeping the accounts, relating to capital outlay, by means of regular records in a register of plant, is discussed in the next chapter, entitled "Industrial Plant: Record of Depreciation," and, in view of the comparative ease with which this can be done, and having regard to the enormous interests and responsibilities involved, it is here seriously suggested that every joint stock and municipal trading undertaking should be required by statute to keep a register of plant, in which the year of purchase and the cost of each of the various classes of industrial plant in which capital is invested should be recorded under proper heads. There would be no difficulty in this from the clerical point of view, even where there are hundreds of classes of industrial plant owned by one undertaking. It only requires the provision of proper equipment.

Check upon doubtful methods.

Such a register would be a valuable check upon doubtful financial methods, where doubtful methods exist, as each undertaking would have to show that it had provided in its revenue account each year a sum to replace expired capital outlay amounting to not less than that necessary according to the declared length of life of each class of plant appearing in the statutory register of plant.

Responsibility for declaration of economic life period

A company or municipality might declare the economic life of each of its various classes of plant as being any period it pleased, from two years to one hundred years; but if a motor omnibus company, for instance, declared the life of the chassis of its motor omnibuses to be fifty years, and so had to provide out of its annual revenue, for expired capital outlay, a sum equal to only 2 per cent. of the original outlay on these, it would obviously stand self-condemned, and certainly no engineer or other official of the company responsible for declaring the efficient economic life period would be willing to certify such a statement in the register of plant. With a system of this kind in general use, a rough standard, falling within reasonable limits, would speedily be established, and it would no longer be possible for profits to be computed, and dealt with, without making any provision whatever for expired capital outlay (depreciation) on industrial plant.

Register does not involve liability upon directors.

It is not suggested that any liability should attach to directors or others in connection with the proposed statutory register of plant, except that a company or municipal body making default in keeping the statutory records would be subject to a sufficient penalty during the continuance of the default. A statutory register of plant would supply a much-needed guide and source of information, it would insure the adoption of a regular and consistent policy, and would form a basis for discussion between the various parties interested, who ought to be able to obtain some information as to the treatment of this important matter. More information would be available for both directors and shareholders than at present, and this alone would tend to relieve directors of much anxious responsibility.

Register might be compulsory on new undertakings only.

Such a register of plant, if made obligatory on all new joint stock and municipal trading undertakings, would not be objectionable to the great body of able and honest directors, who might even welcome it as a help to them, and it would certainly be of assistance to those who are now unaware of the importance of this matter. In the case of existing undertakings, the use of a register of plant might be left as a voluntary question, as there would be some preliminary difficulty in obtaining a basis to start upon, besides other objections which may exist in the case of old undertakings.

Present methods may be improved.

It is certain that much may be done to improve present methods, consisting as they often do partly of spasmodic allocations of revenue account balances to reserve accounts to meet requirements of really unknown extent, and partly of the rough-and-ready apportionment between capital and revenue accounts of large outlays on combined renewals and extensions which must be allotted in some way, partly to revenue as representing maintenance, and partly to capital expenditure as being for betterments, involving an anxious responsibility being placed upon the shoulders of officials who have no very definite rules to guide them; whereas, if a settled and methodical policy be laid down, it will be found that, although the efficient economic life of any class of industrial plant is a matter upon which opinions differ widely, yet there is an outside limit in all cases beyond which no one would be found to go, and even if this outside limit were admitted and provided for out of revenue, a great improvement over the present condition of affairs would ensue.

French company law makes compulsory some annual provision.

It is interesting to note the recognition found in the French Joint Stock Company law of the need of making compulsory the regular setting aside of a portion of the surplus balance of revenue receipts each year to make good expired capital outlay. Every joint stock company in France in which the public are invited to participate is bound to place each year five per cent. of the surplus balance of revenue receipts to reserve. This amount may be increased, but it must not be less than five per cent of such surplus balance. As this reserve accumulates it is devoted to paying off the capital of the company by annual drawings, the holders whose shares have been drawn in the ballot receiving back the par value of their shares, or the amount which has been actually paid up upon them. These holders then receive certificates, called "actions de jouissance," which give them the right to participate in any dividends which may be paid over a certain minimum amount according to the regulations of the company, as well as the right to participate in the surplus proceeds of the realisation of the company's assets in the event of the company being liquidated, while, in the event of liquidation, such holders are not liable to refund the moneys received for these shares when they were redeemed.

Proposed statutory register is a great advance on present methods.

This provision of the French Company law works in a rough-and-ready fashion, for the amount to be set aside is a percentage on the surplus balance of revenue receipts instead of on the wasting capital outlay, but it is important because it makes compulsory some regular annual provision to answer expired capital outlay, even in the absence of any practical method of systematically measuring and recording the amount, and incidentally enabling proper responsibility to be assumed by the management of the undertaking for its reasonable sufficiency. On the other hand the use, by joint stock companies and municipal trading authorities of a statutory register of plant, in some such form as that suggested in the next chapter, would attain these desirable objects with ease, and with considerable precision.

CHAPTER VII.

INDUSTRIAL PLANT. RECORD OF DEPRECIATION.

Annual revenue account should not be charged with cost of new plant or renewals, but should be charged with measured depreciation.

ALL outlays on original, renewal, and additional industrial plant, except the cost of current repairs, are payments made on revenue account to secure benefits extending to a date beyond the year of purchase, and as such are unsuitable to be charged direct to the revenue account of the year of purchase, or of any other one year. They should, therefore, always be charged in the books of an undertaking to capital outlay account, except only the outlays for loose tools and utensils, which are treated separately, as explained later. This is clearly so, whether the outlays are for additional industrial plant, sometimes involving improvements known as betterments, which increase the quantity and/or capacity of the industrial plant in use, or for mere renewals of industrial plant which has either become worn out or unsuitable for use. It is important to observe that no distinction must be attempted between the outlays on additions and the outlays on renewals.✓ All such outlays made within each year should be abstracted from the capital outlay account at the end of each year, and distributed into a register of plant, by means of which the amount of depreciation will be ascertained and charged, in total, to each annual revenue account, being at the same time written off the capital outlay account in the financial books. It is most desirable thus to obviate the need at present existing for endeavouring to distinguish between outlays on additions and outlays on renewals, because the question is beset with insurmountable difficulties, and constantly necessitates the making of arbitrary allocations of large sums between capital and revenue, which cannot fail to be influenced by unsuspected individual caprice and by considerations of the financial convenience of the moment.

Difficulty of distinguishing between additions and renewals.

As an illustration of the difficulty arising in allocating capital outlay between additions or betterments on the one hand, and renewals on the other, take the case of a railway company rebuilding a bridge at a cost of £12,000, to replace a bridge which, twenty years before, had cost £10,000. With the present lack of method in the treatment of capital outlay the new expenditure of £12,000 may be either wholly or partly charged direct to the year's revenue account by one railway company, while another railway company may charge it wholly to capital outlay, and the advisers of a third company may consider that the bridge is better than the original structure, and, therefore, that a portion of the cost, amounting to £2,000 or £3,000, should be charged to capital outlay and the balance charged to the revenue account of the year as part of the cost of maintenance.

Proposed register of plant obviates this difficulty.

Under the system of record suggested in this chapter the register of industrial plant would show at once how much of the original cost of the bridge, amounting to £10,000, had been charged off to the annual revenue accounts by the end of the twenty years, and thus the facts would be known. If the life of the bridge had been originally estimated as, or subsequently adjusted to, a period of twenty years, the whole of the original cost would at the end of that time have been provided out of revenue receipts. Under this system nothing is left to guesswork. The annual revenue accounts will be charged with the cost of maintenance of industrial plant under two distinct heads, one being repairs, which includes all outlay on plant, except the cost of additions, betterments, or renewals charged to capital outlay and duly registered, and the other being depreciation, or expired capital outlay, as measured at the end of each year by means of the register of plant.

Use of official schedule of capital outlay to avoid danger of charging cost of small .

To avoid the danger of outlays on small and partial renewals of industrial plant, in the nature of repairs, being charged in the accounts to capital outlay, instead of direct to annual revenue as renewals and repairs to capital outlay.

repairs, each undertaking should prepare, and adopt the use of, an official schedule containing descriptive particulars of all expenditure which is to be charged to capital outlay, and this schedule may be added to, under proper authority, as fresh questions arise from time to time. All expenditure not clearly defined in the schedule as being capital outlay must be charged under the head of repairs to the annual revenue account of the year in which it is incurred. This official schedule of capital outlay should be settled and kept up to date under the joint control of the engineers' and accountants' departments.

Treatment of scrapped or abandoned industrial plant.

On the scrapping or abandonment of any industrial plant it will be necessary to ascertain, by reference to the register of plant, if any part of the original cost of the plant, so scrapped or abandoned, in excess of the estimated scrap value, still remains in the capital outlay account, and, if so, this balance of cost must either be written off by being included in the measured depreciation to be computed at the end of that year, or some duly authorised arrangement must be made, and noted in the register of plant, by which the amount still remaining will be automatically written off, over the next three, five, or other number of years, by being included in the measured depreciation for each of those years.

Loose tools and utensils.

Loose tools and utensils form part of the industrial plant of an undertaking, but the outlay on these should be recorded separately in the financial books, apart altogether from the capital outlay accounts the contents of which are recorded in the register of plant, because the existing value at any time of these loose tools and utensils can best be ascertained by an annual count and inventory, on the same lines as the annual stocktaking of goods which are intended for resale. All outlay, both for renewal and repair of loose tools and utensils, should, therefore, be charged, through these separate accounts, to the revenue account of the year in which it is incurred, subject to adjustment of stock values at the beginning and end of each year.

Convenient form for register of plant.*

A convenient form for a register of plant is a loose-leaf book, of suitable size, having pages allotted to each class of industrial plant, each page ruled with twelve separate columns, one for each year, each page headed with a description of the industrial plant, and the declared length of life in years, and having a space for the signatures of the officials responsible for declaring that length of life. In making up the financial accounts at the end of each year, any further original or renewal outlay, during the year, on each class of industrial plant, as shown by the

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* Note.—"Leake's Register of Industrial Plant for the Measurement of Depreciation" is published by Messrs. Henry Good & Son, 12, Moorgate Street, London, E.C. Price 5s. 4d., post free.

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ordinary financial ledgers, is transferred in total to the appropriate page and column for the particular year in the register of plant. A half-year's depreciation is then deducted therefrom, and when added to the one year's depreciation, which must be deducted from each of the still unexpired amounts appearing in the previous columns, enables the total provision for depreciation of that particular class of plant for the year to be ascertained and transferred to a class summary. The totals of the three columns (*a*) Capital outlay, (*b*) Depreciation, and (*c*) Balance increasing or decreasing the unexpired capital outlay, for each class of industrial plant, will be ultimately abstracted from each class summary to an annual general summary, the depreciation column of this annual general summary showing the amount necessary to be charged to revenue account for the year before any profit can result.

Register will show many years' history of hundreds of classes of industrial plant.

Many years' history of hundreds of different classes of industrial plant can be recorded in a register of this kind without any confusion ; and if, during the life of any class of industrial plant, it is found in the light of subsequently acquired knowledge that the original estimate was either over or under the mark, this can be easily adjusted, and effect given to it so as to provide for the then unexpired balance appearing in the register being written off over any altered remaining period. Thus, an effective review or survey of the financial position of an undertaking, keeping a systematic record of this kind, can be carried out periodically with considerable precision, and effect given to any altered conditions of some of the classes of industrial plant by suitably modifying the economic life period in the register of plant to meet the new circumstances, and, further, there is a permanent record of this always available.

Measurement of depreciation each month if desired.

When it is desired to measure the depreciation monthly, each column in the register may be used for one month instead of for one year, but for ordinary purposes sufficient accuracy of result can be obtained by taking one-twelfth of the whole depreciation of the previous year, and adjusting the difference in the last month of the financial year.

Division of industrial plant into classes.

In determining the classes into which industrial plant is to be divided for the purpose of record in the register of plant, questions will arise as to the most convenient units to be adopted. The answers to such questions must, in every case, depend on the nature of the particular undertaking; thus, the original cost of construction of a railway station would be one unit of plant, but any number of roughly similar units would be grouped as one class, according to the more or less permanent nature and situation of the stations and their consequent probable duration of economic life, therefore the stations of a railway company will fall under several classes for the purpose of record in the register of plant. In the case of a steamship, the efficient economic life periods of the engines, boilers, and hull will all vary, so that for the purpose of record in the register of plant such property must be divided into at least three heads or classes. In dealing with a fleet of steamships, the hulls, of varying size, but having a common length of economic life, may all be grouped under one class. In the case of the motor omnibus, if the chassis has a shorter economic life than the coach-body, it will be an easy matter to record the cost in the register of plant under two heads instead of one.

Identification of plant by distinctive numbers.

Movable units of industrial plant, such as, say, gas meters, should bear identification numbers; and fixed units, such as buildings, should be so described in the register as to enable them to be always easily identified.

Working illustration of register of industrial plant.

It is now proposed to show in some detail a simple illustration of the working of the register of industrial plant. For the sake of brevity in this first illustration scrap values have been omitted, the method of recording these scrap values being shown in a second, but more condensed, illustration of the register of plant which follows, and is intended more particularly to show the manner of arranging and linking up the loose leaves in the register in such a way as to constitute a perpetual record. In the first illustration the figures are stated in British currency, but in practice it will be found more convenient for purposes of calculation to state the figures in pounds sterling and decimals thereof.

Electric tramway undertaking.

The following particulars have been prepared of a portion of the outlay on industrial plant of an electric tramway undertaking covering a period of twelve years, and these transactions are worked out in some detail in the register of plant illustrated below :—

	Capital outlay.	Annual depreciation provision.	Year's increase in balance of unexpired capital outlay.	Year's decrease in balance of unexpired capital outlay.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1895	88,000 0 0	3,097 1 11	84,902 18 1	
1896	34,500 0 0	7,705 10 8	26,794 9 4	
1897	19,500 0 0	9,891 13 10	9,608 6 2	
			£121,305 13 7	
1898	8,500 0 0	10,928 4 1		2,428 4 1
1899	7,375 0 0	11,564 4 5		4,189 4 5
1900	1,850 0 0	11,913 18 2		10,063 18 2
1901	7,350 0 0	12,297 8 3		4,947 8 3
1902	3,450 0 0	12,743 9 3		9,293 9 3
1903	2,690 0 0	10,930 17 7		8,240 17 7
1904	7,650 0 0	9,732 3 9		2,082 3 9
				£41,245 5 6
1905	29,500 0 0	10,918 8 11	18,581 11 1	
1906	14,040 6 0	12,682 5 2	1,358 0 10	
	£224,405 6 0	£124,405 6 0		
Balance of unexpired capital outlay				100,000 0 0
			£141,245 5 6	£141,245 5 6

The annual capital outlay is shown in total in the first column. The figures in the three other columns are obtainable only through the register of plant with its annual general summary, the working of which is hereunder shown in sufficient detail to enable this to be understood.

Annual outlay compared with annual depreciation.

The particulars show that the undertaking was started in the year 1895, by the end of which year the outlay on industrial plant amounts to £88,000, and the depreciation provision amounts to £3,097, being one-half of a full year's allowance. For the next two years there was a further outlay on industrial plant, and at the end of the year 1897 the balance of unexpired outlay on industrial plant amounted to £121,305 13s. 7d. For the next seven years, to the end of 1904, the yearly outlay on renewals of industrial plant amounts to considerably less than the depreciation provision; so that upwards of £40,000 of the original outlay, for which a capital of about £120,000 was required, becomes gradually liquidated, and would have accumulated in hand in the form of cash or securities. In the year 1905, however, £29,500 was spent on renewals, consisting principally of £21,000 for renewal of track, and in the year 1906 £14,040 6s. was spent, consisting, again, principally of £13,000 for renewal of track; so that by the end of 1906 the balance of unexpired capital outlay on industrial plant had increased from about £80,000, at which it would have stood at the end of 1904, to £100,000.

Reason for difference in annual depreciation in illustration.

It will be noticed, on examining the depreciation column above, that the annual depreciation for the years 1903, 1904, and 1905 has fallen somewhat, and this is caused by the fact that the track work, the life of which was estimated as being only 7·7 years, turned out to have a life of ten years, for it was not until the year 1905 that it had to be renewed. In practice, this might have been easily adjusted as soon as it was seen by the engineers that the track was likely to be efficient for more than 7·7 years. The rates of depreciation are taken from "Electric Railways and Tramways," by Mr. Philip Dawson, in which he gives, as the result of extended study of street railway conditions in America, the following table of allowances for depreciation:—

	Per cent.
Boilers	8 to 10
Turbines	7 to 9
Transformers	5 to 6
Cars...	4 to 6
Track Work	7 to 13
Buildings	1 to 2
Overhead System	3 to 8

The heaviest figure of depreciation is used in each case.

Class record in register of industrial plant.

The history of each separate class of industrial plant will be recorded in the proposed register of plant on a class record, as illustrated below:—

CLASS RECORD.

Description of Industrial Plant: Track Work.

Class No.

Length of Efficient Economic Life: 7·7 years (equal to 13 per cent.).

Sheet No.

Date of Declaration

Declared by

Certified by

Depreciation year.	Year of capital outlay and subsequent annual depreciation deducted.											
	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1895	20,000 0 0											
	1,298 14 0											
1896	18,701 6 0	11,000 0 0										
	2,597 8 0	714 5 8										
1897	16,103 18 0	10,285 14 4	3,000 0 0									
	2,597 8 0	1,428 11 5	194 16 1									
1898	13,506 10 0	8,857 2 11	2,805 3 11	200 0 0								
	2,597 8 0	1,428 11 5	389 12 2	12 19 9								
1899	10,909 2 0	7,428 11 6	2,415 11 9	187 0 3	500 0 0							
	2,597 8 0	1,428 11 5	389 12 2	25 19 6	32 9 4							
1900	8,311 14 0	6,000 0 1	2,025 19 7	161 0 9	467 10 8	350 0 0						
	2,597 8 0	1,428 11 5	389 12 2	25 19 6	64 18 8	22 14 6						
1901	5,714 6 0	4,571 8 8	1,636 7 5	135 1 3	402 12 0	327 5 6	400 0 0					
	2,597 8 0	1,428 11 5	389 12 2	25 19 6	64 18 8	45 9 1	25 1 6					
1902	3,116 18 0	3,142 17 3	1,246 15 3	109 1 9	337 13 4	281 16 5	374 0 6	600 0 0				
	2,597 8 0	1,428 11 5	389 12 2	25 19 6	64 18 8	45 9 1	51 18 0	38 19 3				
1903	519 10 0	1,714 5 10	857 3 1	83 2 3	272 14 8	236 7 4	322 2 6	561 0 9	440 0 0			
	519 10 0	1,428 11 5	389 12 2	25 19 6	64 18 8	45 9 1	51 18 0	77 18 6	28 11 5			
1904		285 14 5	467 10 11	57 2 9	207 16 0	190 18 3	270 4 6	483 2 3	411 8 7	900 0 0		
		285 14 5	389 12 2	25 19 6	64 18 8	45 9 1	51 18 0	77 18 6	57 2 10	58 8 10		
1905			77 18 9	31 3 3	142 7 4	145 9 2	218 6 6	405 3 9	354 5 9	841 11 2	21,000 0 0	
			77 18 9	25 19 6	64 18 8	45 9 1	51 18 0	77 18 6	57 2 10	117 17 8	1,363 12 9	
1906				5 3 9	77 18 8	100 0 1	166 8 6	327 5 3	297 2 11	723 13 6	19,636 7 3	13,000 0 0
				5 3 9	64 18 8	45 9 1	51 18 0	77 18 6	57 2 10	117 17 8	2,727 5 6	844 3 1
					13 0 0	54 11 0	114 10 6	249 6 9	240 0 1	605 15 10	16,909 1 9	12,155 16 11

The annual total of depreciation of each class of plant is ascertained by adding across the amounts deducted from the yearly columns, as shown above. The sums so obtained will equal the amount of depreciation of track work for each year, and each sum is entered in the column headed "Depreciation" in the class summary set out below. Thus the depreciation of track work for the year 1902 is arrived at as follows:—

	£	s.	d.
On outlay in 1895	2,597	8	0
" " 1896	1,428	11	5
" " 1897	389	12	2
" " 1898	25	19	6
" " 1899	64	18	8
" " 1900	45	9	1
" " 1901	51	18	0
" " 1902	38	19	3
	£4,642	16	1

Class summary in register of industrial plant.

The loose leaf, or leaves, containing the history of each class of industrial plant, called the "Class Record," as shown on page 107, will, in the proposed register of plant, be immediately followed by a record for each class, called "Class Summary," as shown below:—

CLASS SUMMARY.

Description of Industrial Plant: Track Work.

Length of Efficient Economic Life: 7·7 years (equal to 13 per cent.).

Class No. Sheet No.

	Capital outlay.			Depreciation.			Balance of unexpired capital outlay.		
	£	s.	d.	£	s.	d.	£	s.	d.
1895	20,000	0	0	1,298	14	0	+18,701	6	0
	20,000	0	0	1,298	14	0	18,701	6	0
1896	11,000	0	0	3,311	13	8	+ 7,688	6	0
	31,000	0	0	4,610	7	8	26,389	12	4
1897	3,000	0	0	4,220	15	6	— 1,220	15	6
	34,000	0	0	8,831	3	2	25,168	16	10
1898	200	0	0	4,428	11	4	— 4,228	11	4
	34,200	0	0	13,259	14	6	20,940	5	6
1899	500	0	0	4,474	0	5	— 3,974	0	5
	34,700	0	0	17,733	14	11	16,966	5	1
1900	350	0	0	4,529	4	3	— 4,179	4	3
	35,050	0	0	22,262	19	2	12,787	0	10
1901	400	0	0	4,577	18	4	— 4,177	18	4
	35,450	0	0	26,840	17	6	8,609	2	6
1902	600	0	0	4,642	16	1	— 4,042	16	1
	36,050	0	0	31,483	13	7	4,568	6	5
1903	440	0	0	2,632	8	9	— 2,192	8	9
	36,490	0	0	34,116	2	4	2,373	17	8
1904	900	0	0	1,057	2	0	— 157	2	0
	37,390	0	0	35,173	4	4	2,216	15	8
1905	21,000	0	0	1,882	15	9	+19,117	4	3
	58,390	0	0	37,056	0	1	21,333	19	11
1906	13,000	0	0	3,991	17	1	+ 9,008	2	11
£	71,390	0	0	41,047	17	2	30,342	2	10

In the register the plus quantities are recorded in the class summaries in black ink, and the minus quantities in red ink.

Annual general summary in register of industrial plant.

At the end of the proposed register of plant suitably ruled loose leaves will be inserted, headed "Annual General Summary," as illustrated below, and the total of the depreciation column of this annual general summary for each year will show the amount necessary to be provided out of the revenue receipts of the year for depreciation before the profit or loss can be ascertained. This amount must, therefore, be charged to the annual revenue account and written off the capital outlay account in the books of the undertaking. The annual general summary of the various class summaries is shown below for each of the twelve years, and the figures appearing thereon will be found to agree with the financial particulars of the undertaking set out on page 104. The class record and class summary of the track work only have been shown in detail above, but it will be understood that in the register of industrial plant a similar class record and class summary for each of the other six classes of industrial plant will be required.

ANNUAL GENERAL SUMMARY.

Sheet No.

	Capital outlay.			Depreciation.			+ or — Balance of unexpired capital outlay.		
1895.	£	s.	d.	£	s.	d.	£	s.	d.
Boilers	5,000	0	0	250	0	0	+ 4,750	0	0
Turbines... ...	3,000	0	0	135	2	8	+ 2,864	17	4
Transformers ...	2.000	0	0	60	4	10	+ 1,939	15	2
Cars	25,000	0	0	753	0	5	+ 24,246	19	7
Track Work ...	20,000	0	0	1,298	14	0	+ 18,701	6	0
Buildings ...	24,000	0	0	240	0	0	+ 23,760	0	0
Overhead System	9,000	0	0	360	0	0	+ 8,640	0	0
£	88,000	0	0	3,097	1	11	+ 84,902	18	1

ANNUAL GENERAL SUMMARY, *continued*—

	Capital outlay.			Depreciation.			+ or — Balance of unexpired capital outlay.			
1896.	£	s.	d.	£	s.	d.		£	s.	d.
Boilers	2,500	0	0	625	0	0	+	1,875	0	0
Turbines... ...	nil			270	5	5	—	270	5	5
Transformers ...	1,000	0	0	150	12	1	+	849	7	11
Cars	16,000	0	0	1,987	19	6	+	14,012	0	6
Track Work ...	11,000	0	0	3,311	13	8	+	7,688	6	4
Buildings ...	nil			480	0	0	—	480	0	0
Overhead System	4,000	0	0	880	0	0	+	3,120	0	0
£	34,500	0	0	7,705	10	8	+	26,794	9	4
1897.										
Boilers	250	0	0	762	10	0	—	512	10	0
Turbines... ...	1,250	0	0	326	11	6	+	923	8	6
Transformers ...	nil			180	14	6	—	180	14	6
Cars	10,000	0	0	2,771	2	4	+	7,228	17	8
Track Work ...	3,000	0	0	4,220	15	6	—	1,220	15	6
Buildings ...	3,000	0	0	510	0	0	+	2,490	0	0
Overhead System	2,000	0	0	1,120	0	0	+	880	0	0
£	19,500	0	0	9,891	13	10	+	9,608	6	2
1898.										
Boilers	1,250	0	0	837	10	0	+	412	10	0
Turbines... ...	4,750	0	0	596	16	11	+	4,153	3	1
Transformers ...	2,000	0	0	240	19	4	+	1,759	0	8
Cars	nil			3,072	6	6	—	3,072	6	6
Track Work ...	200	0	0	4,428	11	4	—	4,228	11	4
Buildings ..	nil			540	0	0	—	540	0	0
Overhead System	300	0	0	1,212	0	0	—	912	0	0
£	8,500	0	0	10,928	4	1	—	2,428	4	1
1899.										
Boilers	1,625	0	0	981	5	0	+	643	15	0
Turbines... ...	nil			810	16	3	—	810	16	3
Transformers ...	nil			301	4	2	—	301	4	2
Cars	5,000	0	0	3,222	18	7	+	1,777	1	5
Track Work ...	500	0	0	4,474	0	5	—	3,974	0	5
Buildings ...	nil			540	0	0	—	540	0	0
Overhead System	250	0	0	1,234	0	0	—	984	0	0
£	7,375	0	0	11,564	4	5	—	4,189	4	5
1900.										
Boilers	nil			1,062	10	0	—	1,062	10	0
Turbines... ...	500	0	0	833	6	8	—	333	6	8
Transformers ...	nil			301	4	2	—	301	4	2
Cars	1,000	0	0	3,403	13	1	—	2,403	13	1
Track Work ...	350	0	0	4,529	4	3	—	4,179	4	3
Buildings ...	nil			540	0	0	—	540	0	0
Overhead System	nil			1,244	0	0	—	1,244	0	0
£	1,850	0	0	11,913	18	2	—	10,063	18	2

ANNUAL GENERAL SUMMARY, *continued*—

	Capital outlay.			Depreciation.			+ or — Balance of unexpired capital outlay.			
1901.	£	s.	d.	£	s.	d.		£	s.	d.
Boilers	500	0	0	1,087	10	0	—	587	10	0
Turbines... ...	3,750	0	0	1,024	15	5	+	2,725	4	7
Transformers ...	nil			301	4	2	—	301	4	2
Cars	2,000	0	0	3,494	0	4	—	1,495	0	4
Track Work ...	400	0	0	4,577	18	4	—	4,177	18	4
Buildings ...	nil			540	0	0	—	540	0	0
Overhead System	700	0	0	1,272	0	0	—	572	0	0
£	7,350	0	0	12,297	8	3	—	4,947	8	3
1902.										
Boilers	1,500	0	0	1,187	10	0	+	312	10	0
Turbines... ...	nil			1,193	13	10	—	1,193	13	10
Transformers ...	nil			301	4	2	—	301	4	2
Cars	nil			3,554	5	2	—	3,554	5	2
Track Work ...	600	0	0	4,642	16	1	—	4,042	16	1
Buildings ...	1,000	0	0	550	0	0	+	450	0	0
Overhead System	350	0	0	1,314	0	0	—	964	0	0
£	3,450	0	0	12,743	9	3	—	9,293	9	3
1903.										
Boilers	500	0	0	1,287	10	0	—	789	10	0
Turbines... ...	750	0	0	1,227	9	6	—	477	9	6
Transformers ...	nil			301	4	2	—	301	4	2
Cars	nil			3,554	5	2	—	3,554	5	2
Track Work ...	440	0	0	2,632	8	9	—	2,192	8	9
Buildings ...	nil			560	0	0	—	560	0	0
Overhead System	1,000	0	0	1,368	0	0	—	368	0	0
£	2,690	0	0	10,930	17	7	—	8,240	17	7
1904.										
Boilers	3,750	0	0	1,500	0	0	+	2,250	0	0
Turbines... ...	nil			1,261	5	2	—	1,261	5	2
Transformers ...	nil			301	4	2	—	301	4	2
Cars	3,000	0	0	3,644	12	5	—	644	12	5
Track Work ...	900	0	0	1,057	2	0	—	157	2	0
Buildings ...	nil			560	0	0	—	560	0	0
Overhead System	nil			1,408	0	0	—	1,408	0	0
£	7,650	0	0	9,732	3	9	—	2,082	3	9
1905.										
Boilers	1,750	0	0	1,520	0	0	+	230	0	0
Turbines... ...	5,000	0	0	1,486	9	4	+	3,513	10	8
Transformers ...	nil			301	4	2	—	301	4	2
Cars	nil			3,734	19	8	—	3,734	19	8
Track Work ...	21,000	0	0	1,882	15	9	+	19,117	4	3
Buildings ...	1,500	0	0	575	0	0	+	925	0	0
Overhead System	250	0	0	1,418	0	0	—	1,168	0	0
£	29,500	0	0	10,918	8	11	+	18,581	11	1

ANNUAL GENERAL SUMMARY, *continued*—

	Capital outlay.			Depreciation.			+ or — Balance of unexpired capital outlay.			
1906.	£	s.	d.	£	s.	d.		£	s.	d.
Boilers	250	0	0	1,250	0	0	—	1,000	0	0
Turbines	nil			1,378	7	1	—	1,378	7	1
Transformers ...	nil			301	4	2	—	301	4	2
Cars	nil			3,734	19	8	—	3.734	19	8
Track Work ...	13,000	0	0	3,991	17	1	+	9,008	2	11
Buildings ...	790	6	0	597	17	2	+	192	8	10
Overhead System	nil			1,428	0	0	—	1,428	0	0
£	14,040	6	0	12,682	5	2	+	1,358	0	10

In the register the plus quantities are recorded in the annual general summaries in black ink, and the minus quantities in red ink.

Further illustration of register of industrial plant.

The following further illustration of the working of the proposed register of industrial plant is intended particularly to show the manner of arranging and linking up the loose leaves in the register in such a way as to constitute a perpetual and uninterrupted record of the history of each class of plant over any number of years. Owing to considerations of space only three annual columns are shown on each class record sheet in this illustration, in place of the twelve columns which are provided in the register of industrial plant. For the particular purpose of this illustration the contraction has the advantage of calling for the use of a fresh class record sheet at the end of each period of three years, instead of twelve years, thus enabling the simple method of indefinitely expanding the records to be shown in a small space.

Particulars of illustration.

The illustration shows the case of a new undertaking, which commenced operations on the 1st January, 1909, being at that time unequipped with industrial plant. The industrial plant subsequently acquired is assumed to consist of four classes, viz.: boilers, turbines, cars, and buildings. In this illustration only the class record sheets for boilers are shown, and these are set out in detail for a period covering two sets of sheets, with an illustration in skeleton form showing the arrangement of the third set of sheets required to follow on. The class summary is also for boilers, and extends only to the end of the year 1913. The annual general summary is for the year 1911 only, and includes in this case the assumed figures relating to each of the four classes of industrial plant. The boilers, being the class selected for detailed illustration, have an estimated efficient economic life of ten years. One or more new boilers are purchased each year, except in the year 1913, when there is no capital outlay on new boilers. The scrap value of the boilers is estimated at about one per cent. of the cost. For the purpose of entering in the register, the original cost is divided into two parts—scrap value and usable value. The outlay on the purchase of new boilers, which, of course, includes the scrap value, is as under :—

1909 ...	£2,020	1912 ...	£505
1910 ...	1,010	1913 ...	nil.
1911 ...	1,515	1914 ...	1,010

By reference to the class summary for boilers, shown on page 118, the effect of the transactions in this class of plant each year can be followed to the end of the year 1913. It will be noted that in 1913 the existing unexpired capital outlay on boilers is reduced for the first time, the transactions in the former years having in every case resulted in an increase in unexpired capital outlay on boilers, after deducting the depreciation of the year. The class record sheets and class summary sheets for turbines, cars, and buildings are not shown, but they would be written up in the same way as for boilers. The annual general summary, shown on page 118, covers the year 1911 only, but an annual general summary will be prepared for each year on the same lines. This annual general summary shows that during the year 1911 the total capital outlay on industrial plant amounted to £4,015, and the total depreciation accruing during the year to £2,775, which amount must be charged to the revenue account for the year under the head of depreciation, thus providing out of revenue receipts £2,775 towards the £4,015 outlay during the year, the balance of £1,240 having to be found elsewhere.

CLASS RECORD.

Class record.

The one sheet below will, in the register, have twelve columns, and will cover the period between the first and the twelfth year inclusive.

FILED 1ST IN CLASS 1.

Boilers. Life 10 years.			Class 1. Sheet 1A.	
O		1909.	1910.	1911.
		£	£	£
Scrap	value.	20		
Usable	value.	2,000		
Depreciati	on1909	100		
			10	
		1,920	1,000	
	1910	200	50	
O				15
		1,720	960	1,500
	1911	200	100	75
	£	1,520	860	1.440

Capital Outlay £2,020, having an estimated scrap value of £20.

Half of one year's depreciation on the usable value, £2,000, is deducted.

Capital Outlay on Boilers is £1,515 in 1911.

The total of the items in this line is £375, being the Depreciation of Boilers in 1911.

See Class Summary and Annual General Summary page 118.

The two sheets below will, in the register, have twelve columns on each sheet, and will cover not less than the period between the thirteenth and the twenty-fourth year inclusive.

FILED 2ND IN CLASS 1.

Boilers. Life 10 years.			Class 1. Sheet 2A.	
		1909.	1910.	1911.
O		£	£	£
		1,520	860	1,440
	1912	200	100	150
		1,320	760	1,290
	1913	200	100	150
		1,120	660	1,140
O	1914	200	100	150
	£	920	560	990

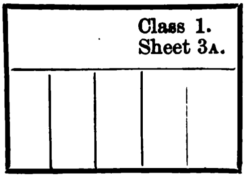
FILED 3RD IN CLASS 1.

Boilers. Life 10 years.			Class 1. Sheet 2B.	
		1912.	1913.	1914.
O		£	£	£
		5		
		500		
	1912	25		
		480	—	
	1913	50	—	
				10
		430	—	1,000
O	1914	50	—	50
	£	380	—	960

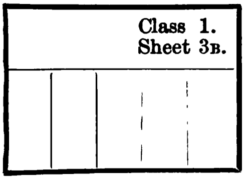
The reducing totals of unexpired capital outlay always include estimated scrap value; thus, the above £920 includes £20 scrap value; the £560, £10; the £990, £15; the £380, £5, and so on. It is unnecessary in a class record to set apart a column for any year unless capital outlay has been incurred during that year.

The three sheets below will, in the register, have twelve columns on each sheet, and will cover not less than the period between the twenty-fifth and the thirty-sixth year inclusive, and to set them out in detail would be needlessly cumbersome.

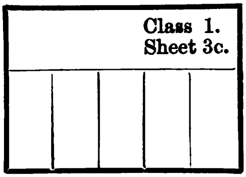
Filed 4th in Class 1.



Filed 5th in Class 1.



Filed 6th in Class 1.



The class record sheets may thus be multiplied to any extent required. The system of numbering the class record sheets should be carefully noted.

Class summary and annual general summary.

Class Summary.

Filed at End of Class 1.

Boilers.			
	Capital outlay.	Depreciation.	+ or − Balance.
1909 ...	2,020	100	+1,920
	2,020	100	1,920
1910 ...	1,010	250	+ 760
	3,030	350	2,680
1911 ...	1,515	375	+1,140
	4,545	725	3,820
1912 ...	505	475	+ 30
	5,050	1,200	3,850
1913 ...	—	500	− 500
£	5,050	1,700	3,350

Annual General Summary.

Filed at End of Register.

	Capital outlay.	Depreciation.	+ or − Balance.
1911.			
	£	£	£
Boilers ...	1,515	375	+1,140
Turbines .	200	700	— 500
Cars ...	1,300	1,400	— 100
Buildings	1,000	300	+ 700
£	4,015	2,775	+1,240
1912.	&c.	&c.	&c.

In the register the plus quantities are recorded in the summaries in black ink and the minus quantities in red ink.

In the case of an established undertaking.

To bring the register into use in the case of an established undertaking an analysis must first be made of the balances standing in the ordinary financial ledgers representing the existing book value of capital outlay on industrial plant, and dividing this existing value into suitable classes for record in the register, showing each type of plant separately, and subdividing each type into groups, each group having a common useful life period. Where a single unit, such as a steamship, comprises several distinct parts, having different lengths of useful life, which are renewable separately, as engines or boilers, or, in a motor omnibus, coach-body and chassis, the outlay may conveniently be subdivided into separate classes for engines, boilers, and so on. If a rough-and-ready computation of depreciation only is required, a division into a few well-defined classes will be sufficient, or, in some cases, the whole capital outlay may even be dealt with as one class, enabling depreciation to be easily computed on cost year by year, instead of on the diminishing ledger balances of cost.

Method of registering outlay and measuring depreciation.

The contents of the analysis will be distributed to separate class record sheets, to be opened in the register for each class as shown above. The unexpired value, with remainder or scrap value shown separately, will be entered on the first line of the first or left-hand cash column, and the total of the amounts so distributed will agree with the balances in the ordinary financial ledgers representing the existing book value of capital outlay. Full instructions as to the manner in which the unexpired capital outlay in each class, at the date the register is brought into use, is to be charged to the revenue accounts of future years should be entered on each class record sheet, and an estimate of the whole useful life period of the class, and of the remainder or scrap value, with any special information as to this, should also be noted at the head of each sheet. At the end of each subsequent year all capital outlay on industrial plant during the year, as recorded in the ordinary financial ledgers, will be analysed and distributed to the next available column in each class record sheet under the head of that year. The year's depreciation will be computed on the original outlay, less scrap value, at a rate according to the instructions in each case, and deducted on the class records from the unexpired outlay appearing in each year's column, and the class summaries will then be written up for the year, together with the annual general summary, the depreciation column of which latter will show the amount to be charged under the head of depreciation to the revenue account for the year.

Initial difficulty in the case of an established undertaking.

In the case of an established undertaking some difficulty will be experienced in determining the proportion in which the then unexpired capital outlay on each class of industrial plant is to be charged to the revenue accounts of future years. This outlay will generally fall under one of two heads, one representing outlay such as that on the construction of a building with a whole useful life period of, say, fifty years, and twenty years may have expired at the date the register is brought into use. Here the matter is simple, it being merely necessary, in future, to write off one-thirtieth of the unexpired capital outlay in each of the remaining thirty years of the estimated future life. The other head is represented by any class consisting of a number of separate units, some of which are renewed from year to year or occasionally, such as, for instance, the meters of a gas company. It may be desirable in cases falling under this head to abstract the outlay on the purchase of new units (in this instance meters) for each former year, and ascertain the present value of each year's purchases by writing up class record sheets for the necessary back period, as it is evident the unexpired capital outlay cannot properly be equally distributed over future years to represent depreciation, as the depreciation will, in fact, be a diminishing quantity each year.

Class record for meters of a gas company.

To make this clear it is necessary to set out a class record relating to the meters of a gas company which buys, say, one hundred new meters each year at a cost of £1 each, the meters having an efficient life of ten years, thus:—

Gas Meters. CLASS RECORD. Life period, 10 years.

NOTE.—The figures within the brackets below represent the unexpired capital outlay on Meters at the 31st December, 1910, exclusive of £100, the cost of new Meters prepared for use as from the 1st January, 1911, and amount to £450.

	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.
	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
1902 ...	100 10																	
1903 ...	90 10	100 10																
1904 ...	80 10	90 10	100 10															
1905 ...	70 10	80 10	90 10	100 10														
1906 ...	60 10	70 10	80 10	90 10	100 10													
1907 ...	50 10	60 10	70 10	80 10	90 10	100 10												
1908 ...	40 10	50 10	60 10	70 10	80 10	90 10	100 10											
1909 ...	30 10	40 10	50 10	60 10	70 10	80 10	90 10	100 10										
1910 ...	20 10	30 10	40 10	50 10	60 10	70 10	80 10	90 10	100 10									
1911 ...	[10 10	20 10	30 10	40 10	50 10	60 10	70 10	80 10	90] 10	100 10								
1912 ...		10 10	20 10	30 10	40 10	50 10	60 10	70 10	80 10	90 10	100 10							
1913 ...			10 10	20 10	30 10	40 10	50 10	60 10	70 10	80 10	90 10	100 10						
1914 ...				10 10	20 10	30 10	40 10	50 10	60 10	70 10	80 10	90 10	100 10					
1915 ...					10 10	20 10	30 10	40 10	50 10	60 10	70 10	80 10	90 10	100 10				
1916 ...						10 10	20 10	30 10	40 10	50 10	60 10	70 10	80 10	90 10	100 10			
1917 ...							10 10	20 10	30 10	40 10	50 10	60 10	70 10	80 10	90 10	100 10		
1918 ...								10 10	20 10	30 10	40 10	50 10	60 10	70 10	80 10	90 10	100 10	
1919 ...									10 10	20 10	30 10	40 10	50 10	60 10	70 10	80 10	90 10	100 10
										10	20	30	40	50	60	70	80	90

The figures in this line = £100, being the total depreciation on Gas Meters for 1911.

Need of back years' records.

If the gas company, not having previously kept a register of industrial plant, proposed to commence the use of such a register as from, say, the 1st January, 1911, the ledger balances of the capital outlay accounts standing in the ordinary financial ledgers must be split up and roughly allocated between the various classes of industrial plant for record in the register. One of these classes will be gas meters, and, assuming that the ledger balances truly represent the unexpired capital outlay and can be correctly allocated to the different classes of industrial plant, the amount allocated to gas meters will be £450, in addition to £100, the cost of new meters prepared for use as from the 1st January, 1911. It might be hastily assumed that, as the meters have a life of ten years, this £450 should be written off to future annual revenue accounts in equal instalments of one-tenth over the next ten years; but this is not so, because although the year 1911 will have the benefit of the use of one thousand efficient meters which were in existence at the date the register is brought into use (one hundred of these being new and unused), the year 1912 will have the use of only nine hundred of those particular meters, because one hundred which have been longest in use will be worn out and useless after the year 1911, and so the numbers will decrease by one hundred each year until, in the year 1919, only two hundred of the one thousand original meters will be in use, all the others having in the meantime been worn out and discarded from time to time. It therefore follows that the £450 of unexpired capital outlay on the nine hundred used meters existing at the 31st December, 1910, should be charged to revenue under the head of depreciation in the following years, as under :—

Year.	£
1911	90
1912	80
1913	70
1914	60
1915	50
1916	40
1917	30
1918	20
1919	10
	£450

A reference to the above class record will show that the total depreciation on meters for the year 1911 will be £10 more than the £90 appearing above, the additional £10 being the depreciation on one hundred new meters assumed to be purchased and ready for use as from the 1st January, 1911. In cases of this kind, when preparing to start a register of plant, therefore, it will be helpful to roughly abstract the past annual outlay on the purchase of plant, such as meters, for instance, for each of the nine years, 1902 to 1910, inclusive, being one year short of the whole life period, and to write up a class record sheet covering this period, for otherwise it will be difficult to equitably distribute the unexpired capital outlay as depreciation to the revenue accounts of subsequent years.

Apparent difficulty in the case of some established undertakings.

An apparent difficulty in the way of measurement of annual depreciation by the use of a register of industrial plant, in the case of some established undertakings, may arise from its being found that the amount of the ledger balance of capital outlay on industrial plant, which also appears year by year on the assets side of the balance sheet as the value of this asset, is much greater than can be allocated to the various existing classes of industrial plant, if these are valued at anything like a reasonable sum. This state of affairs has probably arisen from the fact that in former years the amounts charged against revenue receipts to answer annual depreciation have been inadequate, with the result that the balance of capital outlay on industrial plant has gradually accumulated to an altogether excessive amount. In such cases the difference between the estimated actual value of the existing industrial plant and the balance of the capital outlay on industrial plant appearing in the books should be transferred in the books to a goodwill, establishment, or suspense account, which may, if considered advisable, be gradually reduced in future years by being written down out of profits. It may not in all cases be necessary to disclose these book entries on the face of the published balance sheet, this being a question of policy to be considered in the circumstances of each particular case. In any event it is evident that such a condition of affairs is no bar to the adoption at any time of a plan for the systematic measurement and provision of depreciation on the whole of any industrial plant.

Method of revising estimates of life periods and scrap values.

It has been pointed out in the previous chapter that the written estimates of the two unknown factors relating to the depreciation of each class of industrial plant must be revised whenever current knowledge and experience show that revision is needed, and an illustration of the manner of doing this is given below with the aid of a specimen "class record." In this illustration both the length of the period of useful life and the scrap value have been revised after a lapse of five years from the start.

Illustration of this method.

For the purposes of the illustration (*see* class record on page 130) the sums spent on new boilers each year are assumed to be as under :—

	Outlay.	Estimated usable value.	Estimated scrap value.
	£	£	£
1909 ...	2,020	2,000	20, afterwards adjusted.
1910 ...	1,010	1,000	10 ,, ,,
1911 ...	1,515	1,500	15 ,, ,,
1912 ...	505	500	5 ,, ,,
1913 ...	nil	nil	
	Estimates are revised as from the end of five years from the 1st January, 1909.		
1914 ...	1,000	900	100
1915 ...	500	450	50
1916 ...	800	720	80

The life of the boilers was originally estimated at ten years, and the scrap value at about 1 per cent. of the cost, and the measurement of depreciation proceeded on this basis up to and including the year 1913. It is assumed that in the course of the year 1914 the engineers found that it would pay to scrap the boilers of this class after they had been in use for eight years, instead of ten as originally estimated, and that they could then be disposed of at a sum equal to about 10 per cent. of their original cost. The engineers in charge of this class record accordingly caused to be altered the written estimates of the life period and of the scrap value under date the 21st December, 1914. It will be seen on reference to the class record on page 130 that when, after the close of the year 1914, the accountants proceed to measure the depreciation for that year due effect is given to the altered estimates by drawing a line under the columns containing the records computed on the old estimates to the end of 1913, and proceeding then to compute and note the fraction of the surviving usable value which, according to the new estimate, must in future years be written off each of the annual columns containing unexpired capital outlay. They then re-state in each column the scrap value appertaining to each former year's outlay, according to the new estimate, and also the usable value, and proceed to deduct the depreciation for 1914, measured on the new basis.

The fractions of the surviving usable value to be written off in future years shown in the illustration are arrived at as follows: By the end of the year 1913 four and a-half years' depreciation had been written off the boilers which were brought into use in the course of 1909, and, therefore, when the estimates were altered in the year 1914, there would remain three and a-half years of the new estimate of eight years' life within which to write off the balance of the then surviving usable value. By deducting £202, the new estimate of the scrap value of the 1909 outlay, from £1,120 the balance of the 1909 column at the end of the previous year, the surviving usable value is found to be £918. It will, therefore, be necessary in future years to write off two-sevenths of this usable value in order to reduce the balance of the 1909 column to an amount equal to the estimated scrap value at the end of three and a-half years. The other fractions, two-ninths, two-elevenths, and so on, are determined by the same process of reasoning. It will be seen that, after the new computations have once been made and noted on the class record, it is merely a question in future years of repeating the deductions from each column. The final deduction for depreciation in each column represents one half-year's depreciation only for the reason that the first deduction was in each case for half a year only. The remainder, shown at the foot of each column, represents, roughly, the scrap value according to the amended estimate. An amount equal to the scrap value of the various classes of exhausted plant will, in the financial books each year, be transferred from the debit of capital outlay account to the debit of scrap account, being at the same time ruled off each year under each class record in the register of industrial plant.

CLASS RECORD.

Boilers: Life period, 10 years; altered to 8 years 21/12/14. Scrap value, 1 per cent.; altered to 10 per cent. 21/12/14.

	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.
	£	£	£	£		£	£	£	£	£	£
Scrap value	20										
Usable value	2,000										
1909	100	10									
	1,920	1,000									
1910	200	50	15								
	1,720	960	1,500								
1911	200	100	75	5							
	1,520	860	1,440	500							
1912	200	100	150	25							
	1,320	760	1,290	480	—						
1913	200	100	150	50	—						
	1,120	660	1,140	430	—						
Write off usable value	$\frac{2}{7}$ths	$\frac{2}{8}$ths	$\frac{2}{11}$ths	$\frac{2}{13}$ths	$\frac{2}{15}$ths	$\frac{1}{8}$th					
Scrap value	202	101	151	51	—	100					
Usable value	918	559	989	379	—	900					
1914	262	124	180	58	—	56	= £680, being depreciation on boilers for 1914 on amended estimates.				
							50				
	858	536	960	372	—	944	450				
1915	262	124	180	58	-	112	28	80			
	596	412	780	314	—	832	472	720			
1916	262	124	180	58	—	112	56	45			
	334	288	600	256	—	720	416	755			
1917	131	124	180	58	—	112	56	90	&c.		
	203	164	420	198	—	608	360	665			
1918		62	180	58	—	112	56	90			
		102	240	140	—	496	304	575			
1919			90	58	—	112	56	90			
			150	82	—	384	248	485			
1920				29	—	112	56	90		&c.	
				53	—	272	192	395			
1921					—	112	56	90			
						160	136	305			
1922						56	56	90			
						104	80	215			

Simplicity of method.

To the casual observer it may appear that the treatment of this class record is too complicated to be practicable, but a little study of the matter will show that it is really exceedingly simple, and merely requires the most ordinary clerical attention. It should be remembered that the class record set out above is an important and necessary statement of account relating to capital outlay on boilers, amounting to upwards of £7,000, incurred in the course of eight years, and covering a period of no less than fourteen years, so that the detail cannot be considered excessive.

Use of Remainders in building new plant.

It often happens, in the case of railway and other undertakings, that at the end of the useful life of some class of plant, such as railway passenger coaches, for instance, certain parts are detached and used in the construction of new plant: thus the old wheels may be re-tyred and used in building a new class of horse boxes, and so on. In all such cases, directly the probability of this is foreseen, the intention should be noted in the register of plant as affecting the remainder, or scrap value, of the particular class, and when the transfer of the parts takes place the value must be deducted in the register from the outlay on the old class and added to the outlay on the new class, for which a fresh class record sheet will be opened.

Accidental destruction of plant.

In case of destruction of industrial plant by fire or other accident, the unexpired book value of the plant destroyed must be deducted from the particular class record in the register of plant, and entries made in the ordinary financial ledgers in such a way as to relieve the capital outlay accounts of the value so destroyed.

Outlay on plant at intervals during life period.

It is sometimes known in advance that further substantial outlay will be incurred, as a matter of course, on certain classes of industrial plant at intervals, in order to keep the plant efficient during the useful life period. In such cases the total amount of this further outlay may be estimated and recorded in the register under the year the plant is originally acquired, in order to provide a fair and regular depreciation charge against each year's revenue in return for efficient service. Any such entries in the register of plant must be also recorded in the ordinary financial ledgers, by debiting the capital outlay accounts and crediting a reserve for future capital outlay. As and when the outlays actually take place, the reserve account in the financial books will be debited with the cost, instead of the capital outlay accounts being charged, and any difference between the reserve and the actual outlays must be adjusted.

Treatment of proceeds of sales of scrap.

The proceeds of sales of remainder and scrap should be credited in the ordinary financial ledgers to a remainder and scrap account, and the scrap values as originally estimated and recorded in the register of plant should, as the plant goes out of use, be debited to this account and credited to the capital outlay accounts, the amounts being at the same time eliminated from the columns in the register of plant, so that the amount remaining in the register of plant will always agree with the balance of the capital outlay accounts in the ordinary financial ledgers.

Adaptable nature of register.

To illustrate the adaptable nature of the register, suppose the cost of a railway station buildings to have been originally £5,000, and to be recorded in the register with others of a group having an estimated economic life of fifty years. At the end of thirty years the station is partially pulled down and a new one built, the new expenditure being double the cost of the original station, or £10,000. It will be possible to say, definitely, that £3,000 has been taken out of revenue receipts during the thirty years for expired outlay on the original station, the life of which was estimated at fifty years. It may then be determined either to write off the remaining £2,000, in whole or in part, over the next few years, or to add it to the £10,000 new expenditure, and immediately thereafter revenue account will begin to contribute annually to the reduction of the new total of £12,000. Again, if a railway company decides to reconstruct and greatly enlarge a terminal station, and the total reconstruction and enlargement costs £200,000, it may be determined that, taking all known facts and probabilities into consideration, the efficient economic life of the station shall be estimated at one hundred years. This will involve, in addition to dealing with any balance of cost of the original station, the charging to revenue account of an annual sum of £2,000; or, if it is determined that the efficient economic life shall be declared at fifty years, then £4,000 per annum will be charged to revenue account, and will become part of the operative expense of maintenance under the head of depreciation, the operative expense also including the cost of all structural and other repairs, which will be charged to maintenance under the head of repairs in the years they are incurred. In the case of extensive repairs, such as the repainting of the ironwork, the cost may, if desired, be treated as capital outlay and recorded in the register of plant and spread over the ten or twelve years, or other period, during which the benefit is expected to extend. The charging of £2,000 or £4,000 per annum to revenue is, of course, not intended to represent the annual value of the station, but stands only for the inevitable decay of the structure, which forms part of the operative expense of the undertaking, whether so recorded or not.

Explanations and illustrations are incomplete.

The explanations and illustrations set out in this chapter of the method of using the register of industrial plant, although detailed, are altogether incomplete; but the principles laid down are most important. All capital outlay on industrial plant should be currently accounted for, as it expires year by year, on a recorded basis, coinciding as closely as possible with the actual course of current events. For this purpose a subsidiary accounting equipment, in the form of the proposed register of industrial plant, is needed, and will be found capable of endless adaptation to every conceivable condition which can arise, and, if the general nature of the proposals have been sufficiently set forth, engineers and accountants will themselves best be able to adapt and develop them for practical use.

CHAPTER VIII.

NATURAL RAW MATERIAL AND RECURRING CROPS.

Description of wasting assets under this head.

ANOTHER important division of Wasting Assets includes the mass, or source, of any natural raw material, such as bodies of coal and all kinds of minerals, deposits of slate, stone, gravel, earths, oil, and nitrate, also timber, and all growing plants yielding recurring crops, such as tea and rubber. All capital outlay on main shafts, main adits, shafts which develop ore, and other underground developments, also falls conveniently under this head of wasting assets, as also does the capital outlay on clearing, planting, developing, and weeding estates yielding recurring crops.

Extent of capital outlay on natural raw material and recurring crops.

A large amount of capital is invested each year in undertakings owning wasting assets of the kind dealt with in this chapter. The supplement to *The Economist* of the 18th February, 1911, shows that the fresh capital applied for by prospectus in the English market during each of the two years, 1909 and 1910, connected with such undertakings, was as under :—

	1909.	1910.
	£	£
Mines	8,122,100	7,392,600
Oil	1,918,200	9,466,400
Rubber	5,924,200	19,143,800
Estate and Land ...	3,589,400	5,169,900
	£19,553,900	£41,172,700

The greater part of all this capital will be laid out in the purchase of natural raw material, or in the cost of planting and developing estates to yield recurring crops, and the lives of all such classes of property are finite.

All are payments made in advance on revenue account.

The payments made for the purchase of all this property are, without exception, payments made in advance on revenue account. The property is in each case wholly dedicated to the purpose of earning profits or increase. It is not intended for re-sale in its existing form, and, therefore, as has been already pointed out in the chapter on "Depreciation," subsequent market fluctuations, due to the operation of the law of supply and demand, cannot affect the question of the annual amount of depreciation necessary to be provided out of the revenue receipts of each year to replace the expired outlay or cost of this perishing property.

Depreciation and natural raw material.

In measuring the annual depreciation of the mass or source of natural raw material and land intended for sale, the chief factor to be taken into consideration is the proportion which the volume exhausted by being won—or, in the case of land, exhausted by being sold—in each year bears to the whole volume according to the latest estimates. It may be observed that the factors of expiration of time, natural decay, wear and tear, and obsolescence, which are so prominent in considering the question of depreciation of industrial plant, are absent here; for, in the case of the mass or source of natural raw material, and of land intended for sale, the only question for consideration is the proportion which the annual depletion of the mass bears to the whole mass (known or estimated) which originally represented the capital outlaid.

Depreciation and recurring crops.

In determining the annual amount of expired capital outlay (depreciation) to be taken back out of each year's revenue receipts, in the case of recurring crops, such as tea and rubber plantations, many questions of difficulty will arise. It is, however, clear that the benefit of all outlay incurred in securing planted and developed estates, except only the cost of the land, is temporary and finite, and, therefore, each year's revenue account which receives any part of that finite benefit must contribute something towards the cost of producing every unit of quantity, either weight or measurement, the proceeds or values of which are brought to credit. This annual contribution must be charged against revenue receipts quite independently of the results of each year's trading, which may be either good or bad, and the regularity of the provision should be secured by the use of a carefully prepared scheme, drawn up to suit the circumstances of each case, and capable of adjustment to any altered conditions which may develop in the future. The important point is to secure the regular provision of an annual sum out of revenue receipts upon a settled basis. If the amount is at first wrongly estimated, the rates can be adjusted at a later date.

Depreciation factors to be considered.

In preparing such a scheme it should be borne in mind that the outlay on planting and developing estates of all kinds falls under several heads of a varying degree of permanence. The original cost of clearing jungle land, and draining and road making, for instance, may in some cases be considered of so permanent a nature as to entitle it to be placed in the same category as the site value of the land, and that, therefore, no provision for expired capital outlay need be taken back out of the revenue receipts of each year, but this is at best a doubtful policy. The cost of planting and tending the young plants until they reach maturity, including a proper proportion of supervision and administration expenses, is of a less permanent nature and should generally be dealt with separately. The provision should, in each case, be made by fixing a sum to be charged against the revenue receipts in respect of each unit of quantity the value of which is brought to the credit of each annual revenue account. Unless this is done the economic cost of producing the product will be understated in the revenue account. The policy of charging against annual revenue the cost of up-keep and replanting, only when it is incurred, does not overcome the difficulty that the economic cost of the product will be understated in the earlier years, and probably also in many subsequent years during the currency of the undertakings. The most convenient method of accounting for capital outlay of this kind is to divide it into classes, and record it in a register in the same form as the register of industrial plant explained in the previous chapter.

Depreciation and collieries, mines, &c.

It is obviously impossible to determine with accuracy the proportion which the annual waste taking place in the property of collieries, mines, &c., bears to the total cost of such property. It is, however, always possible to obtain sufficient data to fix the value of such property for selling purposes, and this is generally done by means of estimates of the total number of tons of ore contained in the mines, the assay value per ton, and the cost per ton of raising, smelting, and marketing, from which data a capital value is fixed, which is considered by the purchasers safe and sound enough to justify them in risking their capital in the venture.

Wasting assets dealt with in this chapter all come to an end in yielding their product.

It should be possible, in the case of every undertaking with capital invested in property falling under the heads dealt with in this chapter, to lay down a definite policy on some settled basis to enable a regular charge to be made to the annual revenue accounts to answer that part of the cost of obtaining the annual revenue which is represented by the depreciation (expired capital outlay) of the property. The property in every case will come to an end in yielding its product, and, therefore, each annual revenue account, containing revenue produced by the sale of that product, must be charged with a proportion of the cost of the property before there can be any profit for the year.

Inconvenience of repaying capital in the form of ordinary dividends.

Doubtless undertakings with capital invested in wasting assets of this description are looked upon usually as being on a different footing from other kinds of commercial enterprise, and shareholders in such companies, as a rule, prefer to take their proportion of the surplus receipts in the form of dividends, and make their own allowance for depreciation. The practice of including, without distinction, capital and income in the annual dividends paid to shareholders is, however, becoming increasingly inconvenient, and the custom is probably largely responsible for the long-continued refusal of the Income Tax Authorities, when assessing income tax on such undertakings, to allow deduction from the annual revenue receipts of the necessary provision for wasted capital, with the result that income tax is paid by this class of undertaking on capital as well as on profits.

A remedy for concealed reduction of capital, and an example.

A remedy for the present unsatisfactory state of affairs would be to amend the English statute law to enable undertakings of this character to gradually repay capital to the shareholders by annual instalments, which might be paid together with the annual dividends representing profit, and shareholders would thus receive the same distribution as at present, but accompanied by a statement showing how much of the distribution was attributable to capital and how much to income. The existing English law does not recognise the right of any joint stock company to reduce its capital without, on each occasion, going through a number of formalities, and then obtaining the formal sanction of the Court to this. But in undertakings of this kind the capital is, in fact, reduced every year, because each annual dividend paid to shareholders consists in part, and sometimes wholly consists, of capital, although it purports to be profit. The result is that a company owning a mine originally costing, say, £200,000, which in due course has been completely worked out, having in the meantime returned, say, £300,000 to shareholders in dividends, may still show in its accounts a capital of £200,000, although the capital is, in fact, *nil*.

Illustration of proposed remedy.

A great improvement would be effected over the present unsatisfactory method of treating the accounts of mining and kindred companies if the annual published accounts were so drawn as to show, in each case, how much of each year's surplus of receipts over working expenses —which it is proposed to pay away as dividend—is estimated to be capital, and how much is income, and the details might be stated under the following heads :—

Cost of ore raised and sold.

NOTE.—If the mine had been purchased on an estimated capacity of 1,000,000 tons, and the vendor was paid £200,000, or 4s. a ton, as purchase consideration, then, if 10,000 tons had been raised during the year, £2,000 would be the cost of this.

Depreciation of shafts, adits, and underground developments.

Depreciation of industrial plant, including surface works.

Balance, being profit.

At present the amount paid away as dividend includes not only the balance of profit, but also the other three items, except to the extent of any annual provision which may have been made for depreciation of industrial plant, and for development redemption.

Present "case" law allows concealed reduction of capital.

The apparent illegality of this concealed reduction of capital has been got over by the decisions in the cases referred to at the end of the chapter on "Economic Cost." In these cases it has been held that what is known as "fixed capital" may be legally sunk and lost, and yet the excess of current receipts over current payments may be divided, and this is what usually happens in a case such as the example given in the preceding paragraph.

Depreciation and mine development.

Main shafts, main adits, shafts which develop ore, and other underground developments, fall strictly under the head of "Industrial Plant," but for the purpose of measuring annual depreciation thereon, this kind of property should be treated separately, because the outlay should be gradually refunded out of revenue receipts in the proportion which the quantity of the product won each year bears to the estimated total quantity to which access is expected to be gained by such works.

Accounting equipment for recording depreciation.

The accounting for capital outlay of the character dealt with in this chapter is comparatively simple, but it is important to keep constant watch upon the development of all property of this nature, and to alter the original estimates of volume or capacity whenever this is needed, either owing to the progress of knowledge or from other cause. Additional capital outlay will, doubtless, be incurred from year to year on many of these wasting assets, such as recurring crops, and works undertaken to develop ore, and, therefore, it will probably be found convenient to measure the annual depreciation by means of a subsidiary accounting equipment similar in design to the register of industrial plant, the working of which has been fully explained in the preceding chapter. Such a register can be adapted to all possible conditions, and has the advantage of showing clearly, at any time, the proportion of outlay incurred, in any year, under any head, which has, up to then, been refunded out of revenue receipts. This is practically impossible if the whole of the records are kept in ledger accounts in the ordinary financial books. The register is subsidiary to the capital outlay accounts as recorded in the financial books, but it should be periodically agreed with the balances of these accounts.

CHAPTER IX.

PURCHASED TERMINABLE ANNUITIES.

Nature of purchased terminable annuities.

PURCHASED terminable annuities form a division of wasting assets. They usually run either for a life or for a fixed number of years. Life annuities are the most common form, but annuities extending over a fixed number of years are occasionally purchased, generally in connection with the carrying out of some financial arrangement. A fixed term exceeding twenty years is rare. The rate of interest usually allowed is 3 per cent. to 3½ per cent. per annum.

Loans repayable with interest in equal annual payments.

The purchaser of an annuity of either kind enters into a transaction the effect of which is that he lends money at interest to the grantor of the annuity on the terms that the principal sum is to be repaid to him, together with interest thereon, in equal annual payments. Each annual payment contains both principal and interest, and the unexpired capital outlay representing the present value of the annuity diminishes as each annual payment is received.

Illustration of annuity certain.

The following table shows the amount of interest and repayment of principal contained in each payment of an annuity certain for ten years, interest being at the rate of 3 per cent. per annum. The purchase consideration is £100,000, and the annual instalment received in the form of an annuity is £11,723.

REPAYMENT

of £100,000, with 3 per cent. interest, in ten years, by equal instalments of principal and interest combined :—

Annual instalment = £11,723.

Year.	3 per cent. interest.	Repayment of principal.	Principal outstanding.
	£	£	£
1	3,000	8,723	91,277
2	2,738	8,985	82,292
3	2,469	9,254	73,038
4	2,191	9,532	63,506
5	1,905	9,818	53,688
6	1,611	10,112	43,567
7	1,307	10,416	33,160
8	995	10,728	22,432
9	673	11,050	11,382
10	341	11,382	——
	£17,230	£100,000	

Illustration of life annuity.

The following table shows the amount of interest and repayment of principal contained in each payment of a life annuity, calculated by the $O^{M.}$ 3 per cent. table. In the table below it is necessary to introduce an additional column showing the gain in the event of survival, this gain being equivalent to the loss sustained in those cases where death occurs during the year.

In the case assumed the purchase consideration for an annuity of £26,021 on a healthy life aged eighty is £100,000.

REPAYMENT

of £100,000 invested in an annuity on a healthy life aged eighty.

Amount of annuity (by $O^{M.}$ 3 per cent. table) = £26,021.

Year.	3 per cent. interest.	Repayment of principal.	Balance of principal.	*Gain in the event of survival.	Value immediately after payment of annuity.
	£	£	£	£	£
1	3,000	23,021	76,979	16,567	93,546
2	2,806	23,215	70,331	16,995	87,326
3	2,620	23,401	63,925	17,442	81,367
4	2,441	23,580	57,787	17,856	75,643
5	2,269	23,752	51,891	18,288	70,179
6	2,105	23,916	46,263	18,738	65,001
7	1,950	24,071	40,930	19,100	60,030
8	1,801	24,220	35,810	19,537	55,347
9	1,660	24,361	30,986	19,911	50,897
10	1,527	24,494	26,403	20,279	46,682

and so on.

Factors in annuity can be easily separated.

From the above illustrations it will be seen that the sums received annually from purchased terminable annuities are not income, but that each payment consists partly of capital and partly of income, and that whenever it becomes necessary, for any purpose, the two factors can be easily separated. The circumstance that a person in receipt of an annuity may, and perhaps usually does, elect to expend the whole of the amount of the annuity does not affect its character in any way, or alter the economic fact that the annuitant is expending both his capital and his income together.

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* In a group of such cases, this gain, in the event of survival, would (if the mortality actually experienced agreed with the $O^{M.}$ table) be exactly counterbalanced by the corresponding loss in those cases where death occurred during the year.

Interest factor diminishes annually.

It will be noticed that the interest factor contained in each annual payment, whether from an annuity certain or from a life annuity, is not a constant annual sum, but diminishes year by year. This is, of course, owing to the nature of the annuity contract, which is a specific agreement under which a certain sum of money is advanced in consideration of its being repaid in instalments within an agreed time, either fixed or ascertainable by average, together with interest on the amount of principal remaining from time to time outstanding.

CHAPTER X.

PURCHASED TERMINABLE CONCESSIONS.

LEASEHOLDS.

Inherently wasting assets and other wasting assets.

It has already been pointed out, in the chapter on "Wasting Assets," that wasting assets falling under the first four heads (*a*) to (*d*) there set out may be described as inherently wasting assets, being represented by a corpus, or fund (apart from the value of mere terminable rights to future pure profits or increase), which wastes in the process of seeking profits; and, on the other hand, that wasting assets falling under the remaining five heads (*e*) to (*i*) (which will be considered in this and the following chapters) are not represented by a corpus, or fund, apart from the value of terminable rights to future profits, increase, or advantage, and are, therefore, not inherently wasting assets. This economic difference should be borne in mind, as it is important, especially in connection with an income tax assessable upon annual income arising annually. An exception to the rule in the case of certain kinds of leasehold property is referred to later in this chapter.

Value of concessions and leaseholds consists of rights to future pure profits.

Purchased terminable concessions and leaseholds are alike wasting assets, and they are akin to each other to the extent that, subject to the already-mentioned exception in the case of certain kinds of leasehold property, their values, based on unexpired cost, will be found to consist exclusively of rights to receive and enjoy profits, increase, or advantage expected to arise in future years. The consideration paid for purchased terminable concessions, and also for ordinary leaseholds, therefore, may be accurately defined as payments to the grantor or lessor in advance, under discount, of future pure profits, increase, or advantage expected to arise.

Purchased terminable concessions.

A common case of purchased terminable concession is that of a public authority owning the right to carry on some description of public trading enterprise in the nature of a monopoly, such as a tramway, which is expected to yield annual profits, on the amount of capital required, larger than the profits usually sufficient to attract capital to an enterprise of that description. In such a case the public authority may either itself raise the capital and endeavour to secure the benefit of the large surplus profits which should remain after paying the comparatively low rate of interest at which such public authorities are still able to borrow, applying any surplus to the relief of the rates, or it may sell the valuable monopoly for a term of years to men of business, who will form a company to construct and work the undertaking.

Consideration is future pure profit, paid in advance of its arising.

The consideration payable for such a concession is sometimes a very large sum, and it is important to notice that, whatever form the consideration takes, its present value really represents a payment made in advance on account of pure annual profits expected to arise out of the undertaking in the future. It represents, in fact, that part of the whole expected profit which is surplus profit, in the sense that it still leaves sufficient expected profit remaining to attract the co-operation of men of business and capitalists to the enterprise.

Illustration of purchased terminable concession.

To illustrate the nature of a purchased terminable concession the case may be taken of a concession, granted by a municipality to a company, to construct and work a tramway for a term of thirty years, at the end of which time the tramway is to be handed over, free of cost, to the municipality in good working order. Suppose the estimated value of the tramway in good working order is likely to be £100,000, being the estimated value of the "aged" plant in an average efficient working condition.

Annual provision for expired capital outlay.

If the tramway undertaking, held under such a concession, is properly financed, it must provide out of its annual revenue receipts during the thirty years an annual sum of about £3,333, equal to one-thirtieth of the total consideration (*see* chapter on "The Interest Question"), which will amount to £100,000 at the end of thirty years, in addition to making full annual provision out of revenue receipts for depreciation of plant, before any balance of annual profit will be available for distribution as dividend on its shares.

Nature of consideration.

The present value of deferred consideration, payable thirty years hence and likely then to amount to £100,000, is about £35,000, and this is the cost to the company of the rights to future profits which it has purchased. To put the matter in another way, the company has undertaken to share the future profits with the municipality to the extent of consideration having a present value of about £35,000, or a value at the end of thirty years of £100,000.

Capital when the consideration is deferred.

Suppose the capital of the company to be £150,000, of which sum £120,000 will be sunk in the original cost of the plant (the new plant will absorb more capital than the amount permanently required for the "aged" plant), and the balance of £30,000 is for working capital. The annual surplus of revenue receipts is, say, £17,333, which must be applied as follows:—

Depreciation	£5,000
Provision for expired capital outlay, one-thirtieth of £100,000 (*see* chapter on "The Interest Question")	3,333
Profit available for dividend ...	9,000
	£17,333

Capital when the consideration has been paid in cash.

Supposing, on the other hand, that the consideration was payable in cash at the commencement of the period, the capital required would be £35,000 more, namely, £185,000, and the annual surplus of revenue receipts, still amounting to £17,333, would then be applicable as follows :—

Depreciation	£5,000
Provision for expired capital outlay, one-thirtieth of £35,000 (*see* chapter on "The Interest Question")...	1,166
Profit available for dividend ...	11,167
	£17,333

In this case the annual profit available for dividend is £2,167 larger, enabling a dividend to be paid on a larger capital.

Liquidation of capital when the consideration is deferred.

In both the above cases part of the capital would be gradually liquidated out of revenue receipts during the thirty years until the amount remaining invested in the undertaking is reduced at the end of the period, in the first case, to £30,000, and, in the second case, to £130,000. The difference is owing to the fact that in the first case the tramway is to be handed over, free of cost, to the municipality in good working order, and thus at that time no payment will be made to shareholders by the municipality for the then existing plant, worth about £100,000, which was purchased with the shareholders' capital. In these circumstances it has been necessary to apply the larger sum of £3,333, out of the annual surplus of revenue receipts, to gradually liquidate, during the thirty years, that part of the capital represented by the estimated value of the plant existing at the end of the period, which the municipality will take over free of cost.

Liquidation of capital when the consideration has been paid in cash.

In the second case, the original capital investment of £185,000 would be partly liquidated during the thirty years, until, at the end of the period, it should stand at £130,000, of which £100,000 would be payable by the municipality for the value of the then existing plant (in this case the municipality was paid the £35,000 purchase consideration in cash at the commencement of the period), and £30,000 would be realised from the sale of such assets as debts, stock, &c., in which the working capital of £30,000 will be found still invested. The balance of £55,000 would have been gradually liquidated out of revenue receipts retained in hand during the thirty years, as to £20,000 released from the plant, which, when new, cost £120,000, but has an average value as "aged" plant of £100,000 only, and as to £35,000 the total amount allocated out of profits to refund the cost of the concession. The original capital of £185,000 has thus been kept intact, and will all be duly repaid to shareholders at the expiration of the concession.

Difference in the financial results when consideration deferred and when payable in cash.

It is important to notice that, assuming equally capable management and other equal economic conditions, the annual surplus of revenue receipts of the tramway undertaking would be £17,333, whether it be carried on by the municipality or by a company acquiring the concession under the terms set out in either the first or the second case. Of this £17,333, £12,333 is pure annual profit.

It may also be noticed that the terms upon which the company acquires the concession in the first case, when the consideration is payable at the end of the period, give the most favourable results to the shareholders. In that case, the average capital employed during the period of thirty years will be about £90,000, while the annual profit available for dividend is £9,000, or sufficient to pay 10 per cent. per annum. In the second case, £35,000 is taken as being present consideration, payable in cash, alternative to about £100,000, payable thirty years hence, the basis being the 3 per cent. compound interest table. Here the average capital employed will be £157,500, and the profit available for dividend £11,167, or sufficient to pay about 7 per cent. per annum. The reason is that the facts assumed in the first case operate to defer a present payment of £35,000 for thirty years, charging, in the meantime, only 3 per cent. compound interest thereon, and thus the additional £35,000 capital needed in the second case is, in effect, in the first case allowed by the municipality to remain outstanding for the term of thirty years at a low rate of interest, leaving, therefore, a larger proportion of annual profit available to pay dividends on a smaller capital.

Legal facilities needed to enable surplus capital to be repaid to shareholders.

It often happens in carrying on an undertaking, and especially a terminating undertaking, as in the cases set out above, that a large amount of the capital originally required and invested for the purposes of the business becomes gradually released during the period of carrying on the business, and is not likely to be required again. In such cases some easy means should be provided by law to enable a company to gradually repay capital sums to the shareholders by annual instalments, which might be paid together with the annual dividends. The top of the payment warrant for each such compound remittance should contain a statement showing clearly how much of the amount is repayment of capital and how much is annual dividend. As the English law stands at present, the only means of gradually repaying capital which is not needed appears to be for the shareholders to exchange their share holdings in the company for holdings represented by debentures, which may legally be repaid ; but this is a clumsy method, and one which is rarely resorted to. This matter has been already referred to in the chapter on "Natural Raw Material," when discussing the financial treatment of mines and other terminating enterprises. There can be no doubt that the absence of legal facility for repaying surplus capital strongly encourages the payment to shareholders of the annual surplus revenue receipts as dividend, though in reality they consist not only of profit, but also of the proceeds of capital investments which are being gradually liquidated.

Leaseholds.

The consideration paid for leasehold property is the rent of future years paid in a lump sum in advance by the lessee to the lessor, and, as time expires, therefore, the surviving exchangeable value of leasehold property, based on its unexpired cost, which is the only factor entering into commercial accounting, becomes less.

Repairs and maintenance at cost of lessee.

When leasehold property is held under a grant in the common form, the consideration paid usually entitles the lessee to the use of the land and buildings for a fixed term of years, subject to his undertaking to repair and maintain the property at his cost during that term. The exchangeable value of such leasehold property at any time based on its unexpired cost is, therefore, represented wholly by rights to pure profit, increase, or advantage expected to arise in future years, and it is thus a wasting asset of a nature similar in this respect to that represented by purchased terminable concessions.

Repairs and maintenance at cost of lessor.

Leasehold property is also held under a less common form of grant, which entitles the lessee to the free use for a fixed term of years of land and buildings, &c., which are, during the term, to be maintained and upheld by, and at the cost of, the lessor, in which case the consideration paid will include not only the net annual value of the property during the years of the term, but also a sum covering the estimated cost of repairs and maintenance during that term. In this case, therefore, the exchangeable value of the leasehold property, based on its unexpired cost, includes not only the right to the use and enjoyment of the premises during the term, but also the right to call for the performance, free of charge, of the necessary repairs and maintenance.

Importance of distinction between the two kinds of wasting assets.

To the extent, therefore, that the value of such leasehold property, based on its unexpired cost, consists of rights to call for the free performance of such services, it represents an inherently wasting asset, and, in view of the importance of the distinction between the two kinds of wasting assets in the scheme under which British income tax is assessed on annual value, as it arises annually, at its source, it is worth noticing that this particular class of leasehold property appears to be the only kind of wasting assets which cannot be classified with precision, either as belonging to the class of inherently wasting assets (*see* chapter on "Wasting Assets") or to that other class of wasting assets whose value is represented wholly by rights to pure profit, increase, or advantage expected to arise in future years.

CHAPTER XI.

COPYRIGHTS, PATENT RIGHTS, GOODWILL, TRADE MARKS.

Characteristics common to these wasting assets.

ALL forms of exchangeable value represented by unexpired capital outlay on the purchase of copyrights, patent rights, goodwill, and trade marks are wasting assets, and they have the common characteristics that their value arises out of work done in seeking profit, increase, or advantage which has not yet been fully realised. All capital outlay on property of this description is subject to depreciation due to expiration of time and obsolescence. Wasting assets of this nature are not inherently wasting assets, being represented only by mere rights to future profit, increase, or advantage expected to arise in future years.

Nature of their exchangeable value.

Whenever monetary or other consideration passes from one party to another for the transfer of the ownership of this kind of property, the payment is in effect the carrying out of an agreement under which the purchaser pays in advance to the seller a share of a portion of the profits expected to arise in future years. These expected profits may or may not arise, but of this the purchaser takes the risk. It is important to observe that, except where property of this kind has been transferred from one person to another for valuable consideration, there is no capital outlay, and, therefore, there can be no expired capital outlay to be refunded out of future profits, except, perhaps, the actual cost of obtaining patent rights or developing goodwill, which may have been charged in the accounts as capital outlay.

Expected future surplus profits.

The portion of the expected future profits which has exchangeable value is only the surplus profits, that is, the amount by which the future profits is likely to exceed the sum needed to attract ability and capital to the enterprise. If the whole expected future profits is not more than sufficient to adequately reward the ability and capital needed to earn those profits, then no present exchangeable value can exist.

Provision for expired capital outlay.

The obligation to make regular provision out of annual profits for expired capital outlay on property of this description is, if rightly considered, quite unaffected by the circumstance that, either at the time of purchase or at any subsequent date, the property may be worth more than the price paid for it. The question is not the present exchangeable value of the property, but the proportion of the capital outlay on the purchase of the wasting assets which has expired. If the wasting assets represented by the capital outlay are not permanent, then any enjoyment of the limited opportunity for their economic use in revenue earning must be paid for, because the wasting assets, be their value great or small, are concurrently becoming exhausted, and so are nearer their end, and the capital outlay thereon has by so much expired. In other words, the whole usable capacity (apart from monetary value) of wasting assets is represented by the capital outlay thereon, and the capital outlay expires simultaneously with the usable capacity, which must always be a decreasing quantity.

Copyrights.

The author may elect to retain the copyright of his works in his own hands, being content to receive the yearly income as it arises, instead of compromising the matter by parting with his rights to future profits in exchange for a present payment in cash or other consideration. The exchangeable value of a copyright (if any) exists, though it may never have passed from one to another by sale and purchase. But the financial position of the author-owner of a copyright is different from the financial position of the purchaser-owner to the extent that whereas the former may take and enjoy the whole of the annual profits arising from his work, the latter must first refund out of those annual profits the share which he has already paid in advance to the author, in the form of purchase consideration, for the copyright.

Patent rights.

The inventor may elect himself to manufacture and sell the subject-matter to which his protected inventions apply, and in that case he may safely take and spend the whole annual profits arising, without reference to the facts that the limited term of the patent rights is expiring, and that competition, obsolescence, and other change, must inevitably destroy the demand at some future time. But the purchaser of patent rights, on the other hand, must have due regard to these facts, and must set aside out of his annual profits the estimated share which he has already paid in advance to the inventor. Subsequent fluctuations in the market value of an invention do not affect the obligation to refund, out of every hundred pounds of profits earned, the percentage which has already been paid in advance to the inventor. The percentage may be either large or small, but the principle which necessitates some provision is clear.

Goodwill. Trade marks.

It is said that the term "goodwill" has two meanings, which may be conveniently distinguished as personal and local goodwill. Personal goodwill is that interest which is sold along with a profession, and is transferable from one person to another by the recommendation of the seller, and his agreement not to compete with the buyer, as when a doctor or a dentist sells his practice. Local goodwill is the exchangeable value attaching to a particular business, at a particular place, or, as Lord Eldon defined it, "the chance that the old customers will resort to the old place" without the further advantage of personal stipulations with the seller, as in the sale of such a business as "The Railway Hotel" or "The Market Shop." Local goodwill of this description, however, forms part of the annual value of the premises, for though it may have been created by the personal ability and industry of the owner of the business, yet it vests in the person entitled to the occupation of the premises. Capital outlay on this kind of property is for this reason generally described as "Leaseholds and goodwill." There is also another kind of goodwill, the value of which resides in the right to the use of well-known trade names, such as "Bass," "Guinness," "Dunlop"; and of trade marks, such as the registered design of a hand or a plough.

Goodwill must be written off.

The argument is sometimes used that goodwill can only be written off when its value undoubtedly exists; that is to say, when the profits of the particular undertaking are so large that there is a surplus over and above the amount needed for the ordinary reward of the ability and capital devoted to the business. But this is surely a misapprehension, unless, indeed, it can be shown clearly that the particular future surplus profits, which have been already advanced to the seller in the price paid for the goodwill, were actually expected to arise at a still later date from the work of the seller. The bargain has been made, and the expired capital outlay must be duly refunded out of future profits with the same certainty that the money paid for current expenses must be refunded out of revenue receipts if a correct statement of the owner's economic profit and loss is required.

Substituted exchangeable value is not a sound alternative.

It cannot be too clearly stated that the obligation to refund, out of future profits, the expired capital outlay on goodwill is neither excused nor lessened by the fact that there may be fresh goodwill arising out of the exceptional ability of the present management, or out of any unexpected later developments of the business, of an exchangeable value as great, or greater, than the amount originally paid. In other words, exchangeable value arising from unexpected developments taking place subsequently, and which was, therefore, not included in the original capital outlay, cannot properly be substituted for that which has expired. Otherwise, by parity of reasoning, any undertaking would be entitled to add to revenue, and charge to capital outlay, sums purporting to represent the exchangeable value of self-created goodwill.

Increase in value of goodwill is not part of annual profit.

It is sometimes argued that an increase in the value of the goodwill of an undertaking is part of the annual profit, on the ground that it is an increase in the present exchangeable value of the concern. Such an increase in exchangeable value is clearly distinguishable from the annual profit which actually arises, year by year, out of the business of an undertaking. Any increase in the value of the goodwill is merely the present value of the right to receive, if and when realised, at a future time, certain surplus profit expected then to arise out of the business.

Illustration of accounting for capital outlay on goodwill.

Suppose the proprietor of a well-established business, in which £10,000 capital is invested, and which earns a regular profit of £3,000 per annum, sells the whole undertaking to a company for £25,000. The capital of the company will be £25,000, represented by assets in the following form:—

	£
Goodwill	15,000
Other assets, *less* liabilities ...	10,000
	£25,000

The question, How is the £15,000 to be refunded out of the profits of future years? is not easy to answer, but there is no doubt that it should be so refunded. The sum paid for goodwill must have some relation to the amount of the estimated future profits, and the value of the goodwill in a case such as that set out above is generally fixed by multiplying the past average annual profits by three, five, or more, this being known as the three, five, or other years' purchase basis.

It is suggested, therefore, that the least that can be done is regularly to appropriate some percentage of future profits to write down expiring capital outlay of this nature. The benefit of the estimated value existing at the time the goodwill was purchased may possibly extend to fifty years, or even more in some cases, but the period is more likely to be between ten and thirty years. If the basis of some percentage of future profits be adopted, it will be necessary to estimate the period over which the benefit will extend, and also to estimate the total profit likely to be earned during that period. This should not be impossible, because, in fixing the existing value of the goodwill, some attention must already have been given to these aspects of the matter.

In the case of the well-established business mentioned above, if the benefit period was estimated to extend to twenty-five years, and the total profit to be earned during that period was estimated at £75,000 (£3,000 × 25), then 20 per cent. of the annual profits must be appropriated each year to answer the expired capital outlay on the goodwill, this being the percentage which £15,000 bears to £75,000.

Assuming then, for the sake of illustration, that the annual earnings of the business remain constant after its transfer and are exactly as before, they would be applicable as under :—

	£
Written off goodwill, 20 per cent. on £3,000	600
Profit available for dividend on the share capital of £25,000, being at the rate of £9 12s. per cent. per annum ...	2,400
	£3,000

It is undoubtedly sound financial policy to appropriate the largest possible sums out of surplus profits to write down the book value of goodwill, and it is as certainly unsound policy to wait for surplus profits to become available, for it is clear that at least some percentage of all profits earned should be regularly appropriated for this purpose.

CHAPTER XII.

WASTING ASSETS AND AN INCOME TAX ON ANNUAL INCOME.

Need of reasonably accurate methods of computing annual profit and loss.

In order that an annual income tax may be equitably levied on annual income arising, it is obviously necessary that reasonably accurate methods of computing annual profit and loss shall be in common use, as otherwise considerable difficulty is sure to arise in making the annual assessments on the sums upon which the tax is to be levied, leading to mischievous friction between the taxing authorities and the taxpayers.

Danger of levying income tax on that which is not income.

An income tax on annual income arising should doubtless be levied on the nearest possible approximation to true annual economic profit, and on nothing else. This is important, not only because it tends to prevent excessive friction and difficulty arising in the collection of the tax, but also because the alternative, frequently involving the taxing, as income, of sums which consist partly of capital, gives an apparent official sanction for treating such sums as being economic profit, and, therefore, as being wholly distributable as dividend, although a large part may be nothing but capital which was originally invested in wasting assets, and has subsequently, in the ordinary course of the business, passed again into the form of cash. This subject is dealt with in the chapter on "Fixed and Floating Capital."

Opportunity to encourage proper accounting.

The assessment of an annual income tax must always present great difficulties, owing largely to failure on the part of vast numbers of those liable to be assessed to an income tax to keep proper and adequate accounts, and thus, when laying down rules for assessing an annual income tax, it seems well worth the serious consideration of the executive of any State, obtaining part of its revenue from this source, whether special consideration should not be shown to individuals and corporations who give proper attention to accounting (an ever-increasing number) to the extent of accepting, subject to necessary adjustments, the amount of the annual profits shown by their regular and properly prepared accounts as the amount upon which income tax is to be assessed. Thus the capital of all such individuals and corporations, being systematically accounted for, would escape taxation as income in passing, from some form of fixed capital outlay, again into the liquid form of cash.

Surplus of annual receipts *versus* economic profit.

Owing largely to the absence of systematic accounting, an income tax is of necessity at present generally assessed upon an amount representing the surplus balance of annual revenue receipts over revenue payments, made in or about the period covered by the accounts, rather than upon the true economic profit, and this certainly tends, as above suggested, to encourage and give official sanction to the annual distribution, by corporations and other public undertakings, of amounts in excess of the actual annual profits earned, resulting in widespread financial evils, the magnitude of which is little understood.

British income tax.

British income tax is levied under the provisions of the Income Tax Act, 1842, modified by a number of subsequent enactments, and, according to the statute law, it is assessable annually on annual profits arising. The Income Tax Act, 1842, was a reprint of the Income Tax Act, 1806, with a few additions. The tax was, for many years after its re-introduction in 1842, considered to be of a temporary nature, and it is only in recent years that it has been officially acknowledged as a permanent instrument of revenue.

Original difficulties and scheme of assessment.

In 1842, when the present Income Tax was reimposed as a temporary measure, the conditions of commerce were very different to those now existing, and scientific accounting was practically unknown; thus at that time it was a matter of the utmost difficulty to assess the annual profits or losses arising from the vast number of separate businesses then carried on by individuals. An official scheme of assessment of annual profits was, however, gradually evolved to meet the then existing conditions, under which rules were laid down for the guidance of the staff of the Inland Revenue Department to enable them to determine what expenses were to be allowed as deductions from revenue receipts in assessing annual profits, and what, at that time, were to be disallowed.

Antiquated precedents.

This scheme of assessment of annual profits was gradually developed, and the necessarily arbitrary rules made under it were largely upheld in the early cases decided by the Courts of Law, thereby forming precedents which have evidently influenced more recent decisions in comparatively enlightened times, and thus the present British income tax law is based largely upon the original scheme of assessment, framed for the collection of a supposed temporary tax, at a time when commercial conditions were very different, and when scientific accounting was unknown, and it certainly needs amendment, particularly as regards the allowance of deduction from annual revenue receipts of expired capital outlay on inherently wasting assets.

Expired capital outlay largely ignored.

Under these circumstances it is not surprising that there is often a wide difference between the official view of annual profit and the view of the taxpayers on the subject. This arises principally from the fact that the official method of assessing profits under the scheme of assessment seeks to confine the deductions allowed from annual revenue receipts to those expenses which are payable in cash in or about the year of assessment, and seeks to ignore, or to recognise grudgingly, that important factor of economic cost which is represented by expired capital outlay on inherently wasting assets.

Inadequate allowances and inadequate methods of accounting.

Deduction is allowed (under Section 12 of the Customs and Inland Revenue Act, 1878) for diminished value by reason of wear and tear of machinery, plant, and ships; and, in certain cases, deduction is allowed for diminished value due to obsolescence; but inherently wasting assets cover a much wider field, and even the allowances granted for wear and tear of machinery, plant, and ships are often inadequate, owing, no doubt, largely to the inadequate and irregular manner in which this important factor of cost is still treated in commercial accounts.

Wear and tear computed on reducing balance of cost.

The allowance granted for diminished value by reason of wear and tear, during the year, of machinery or plant, is most commonly computed by the Income Tax Authorities by deducting a percentage from the reducing balance of cost of the machinery or plant. It has already been demonstrated in Chapter VI. that this method is absurdly inadequate; but while it remains in common use in commercial accounting, the

Income Tax Authorities can scarcely adopt another method. Complaint is often made that the rate per cent. allowed on this basis is too low, but it should not be overlooked that the rate allowed must not provide more than a fair annual amount for the first year; thus, on this basis, if the estimated life of the plant is twenty years, the rate allowed in the first year must be limited to five per cent., for otherwise the allowance, for that first year, will be excessive. The fact that it takes about fifty-eight years to write off the cost of plant, having a scrap value of five per cent., if a rate of five per cent. on the reducing balance of cost be employed, is no reason for allowing more than an adequate amount, being one-twentieth of the cost, out of the revenue receipts of the first year.

Amount of wear and tear allowance is in absolute discretion of Commissioners.

It seems to be commonly overlooked that Section 12 of the Customs and Inland Revenue Act, 1878, expressly leaves the amount of the allowance for diminished value by reason of wear and tear of any machinery or plant in the absolute and unfettered discretion of the Commissioners for general or special purposes. The Commissioners—chosen from the general body of taxpayers—appear therefore to have power to determine the amounts of allowances for wear and tear, without consulting or referring to the taxing officers, and, although this power does not seem to be often independently exercised, it is well that its existence should be borne in mind.

Nature of allowances for diminished value which cannot properly be claimed.

In considering the deduction of expired capital outlay which should be allowed from annual revenue receipts, it is important to bear in mind that expired capital outlay on wasting assets, other than inherently wasting assets, cannot properly be claimed as a deduction from annual revenue receipts in assessing annual profit for income tax purposes. As already explained in previous chapters all these other wasting assets consist exclusively of purchased rights to future pure income expected to arise over a series of later years, when it will become taxable; and if deduction, from annual revenue receipts, of this kind of expired capital outlay were allowed, British income tax could be largely evaded by the simple process of selling to another person the rights to the future income, thereby enabling not only the original owner to secure that future income free of tax in advance of the years in which it will arise and become normally chargeable with British income tax, but also enabling the present owner to secure it free of tax, for he would be entitled to set off his expired capital outlay, represented by the consideration paid by him for the future profits (a lump sum not then assessed to income tax), against the actual profits he received each year, and so the annual income would escape taxation altogether.

Wasting assets which are not inherently wasting assets.

Such wasting assets, which are not inherently wasting assets, include, for income tax purposes, the following:—

Capital invested in purchased terminable concessions,
Leaseholds,
Copyrights,
Patent Rights,
Goodwill and Trade Marks;

but it is important to notice that deduction of expired capital outlay invested in wasting assets of this nature should be allowed for income tax assessment purposes, whenever the original owner would not have been subject to British income tax, if the source of income had remained in his hands. An instance of such an exception would be capital invested in a purchased terminable concession outside the United Kingdom, for here the original owner of the source of the future annual profit to arise would not have been subject to British income tax, and, therefore, the expired capital outlay necessary to be refunded out of revenue receipts, before any annual profit can result, should be allowed as a deduction from revenue receipts in assessing British income tax. The assessment to British income tax of the whole of the annual profits arising from such foreign concessions must tend to restrict, and sometimes even to prohibit, all transfer business of this nature, which is, of course, always open to the bids of financiers in the other countries of the world.

Leasehold property.

It has already been pointed out, in the chapter entitled "Purchased Terminable Concessions. Leaseholds," that leaseholds, under which the lessor not only grants to the lessee the right to the use and enjoyment of the property during the term of the lease, but also himself undertakes, either wholly or partially, to repair the property, free of charge, during that term, are to some extent exceptional. Thus the capital outlay on leasehold property of this particular kind appears to represent the only description of wasting assets which cannot be classified with precision either as belonging to the class known as inherently wasting assets (*see* chapter on "Wasting Assets") or to that other class of wasting assets whose value, based on unexpired cost, is represented wholly by rights to pure profit, increase, or advantage expected to arise in future years. It is necessary, therefore, to consider the treatment of this kind of property in connection with the scheme of assessment of British income tax.

Deduction allowed for repairs.

British income tax is assessed upon lands or houses under what is known as Schedule A, the annual value being estimated otherwise than by relation to profits. The annual value is estimated without allowing any deduction for the cost of repairs, or for depreciation, and formerly the income tax had to be paid upon that amount. But now, under Section 35 of the Finance Act, 1894, the assessment on lands, inclusive of the farmhouse and other buildings (if any), is reduced by one-eighth, and upon any house or building (except a farmhouse or building included with lands in assessment) by one-sixth, in respect of the cost of repairs, both deductions being subject to certain restrictive safeguards contained in the section. The relief granted by this section is evidently, and according to official interpretation, intended to apply to the cost of repairs only.

No further allowance for depreciation of leaseholds is permissible.

It has been said that the owner of leasehold property which the landlord has undertaken to keep in repair is the owner of a wasting asset, the value of which, based on cost, includes something more than rights to future pure profits, and is, therefore, to that extent an inherently wasting asset. But, under the provisions of Section 35 of the Finance Act, 1894, the owner of such leasehold property gets, by way of deduction from the assessment, an annual allowance for repairs equivalent to the annual waste of that part of the cost of the property which was in respect of the cost of future repairs to be done by the lessor. The lessee has, in effect, merely paid the cost of repairs in advance as part of the cost of the lease, and is not entitled to any more consideration on this account than the lessee, who, having paid less for his lease, himself pays the cost of repairs as and when incurred from year to year. Owners of leasehold property of both classes get an allowance of one-sixth from the assessment to cover the cost of annual repairs.

Deduction allowed for maintenance, repairs, insurance, and management of land and farm buildings.

Some further relief from income tax under Schedule A is granted under Section 69 of the Finance Act, 1910. This section applies only to any land (inclusive of farmhouses and other buildings, if any) the assessment on which is, for the purpose of collection, reduced under Section 35 of the Finance Act, 1894, and to any houses the annual value of which, as adopted for the purpose of income tax under Schedule A, does not exceed eight pounds, the assessment on which is so reduced. House property, therefore, is practically altogether excluded from the operation of the section, the practical effect of which is to enable the owners of land and farm buildings, as well as of the smallest class of house or cottage, to obtain a further allowance to cover the cost of maintenance, repairs, insurance, and management, bringing the maximum allowance up to a sum equal to 25 per cent. of the assessment.

Maintenance includes cost of replacement of farm buildings, &c.

It is interesting to note that, for the purposes of Section 69 of the Finance Act, 1910, the term "maintenance" includes the replacement of farmhouses, farm buildings, cottages, fences and other works where the replacement is necessary to maintain the existing rent. This is the first statutory recognition that depreciation must be allowed as a deduction, in some way or another, in computing the net annual value of land and house property. The allowance in this case is, however, treated as if the depreciation occurred at the date of the renewal, instead of, as the fact is, gradually over the efficient life period of the buildings, fences, and other works.

Shortcomings of present scheme of British income tax assessment as regards depreciation allowances.

As regards depreciation allowances, therefore (an important part of economic cost), it is evident that the present scheme of British income tax assessment falls short of a system which would enable income tax to be levied on the nearest possible approximation to true annual economic profit in many important respects, and these may be summarised as follows :—

(a) The allowance for depreciation of machinery or plant, granted under Section 12 of the Customs and Inland Revenue Act, 1878, is often inadequate, and the legal definition of machinery or plant is inconveniently restricted.

(b) No depreciation is allowed on builings, save

the cost of replacement of farm buildings, &c., which is allowed under certain conditions (Finance Act, 1910).

(c) No depreciation is allowed on furniture and fixtures, although it is the practice not to raise any objection to allowing the cost of replacements, if and when incurred.

(d) No depreciation is allowed on the mass or source of any natural raw material, such as coal, iron, &c., or in respect of timber and other kinds of growing plants yielding recurring crops.

(e) No depreciation is allowed in respect of the cost of sinking vertical shafts undertaken to obtain access to natural raw material.

(f) No depreciation is allowed on the capital element in purchased terminable annuities.

Further, it is suggested, on grounds of public policy, that in assessing income tax, deduction should be allowed for expired capital outlay invested in the purchase of wasting assets (other than inherently wasting assets), such as purchased terminable concessions, patent rights, and the like, in all cases where the original owner would not have been subject to British income tax if the source of income had remained in his hands. The reason for this has already been stated in this chapter. But while it is clear that, as regards the deductions allowed from gross income for annual depreciation (expired capital outlay), the present scheme of British income tax assessment leaves much to be desired, it must be admitted that this is largely due to the almost universal neglect on the part of the commercial community to make systematic and regular provision for this important part of economic cost.

APPENDIX.

TABLE showing the proportion of the whole-life comparison with the proportion of the cost ch distribution in common use:—

Cost of Industrial Plant £100
Efficient Life Period ... ... 10 years
Scrap Val

	Estimated proportion in which the total quantity of output is receivable in each year of the efficient life period.	Below highest output.	METHO			
			A Original cost basis.		**B** Reducing balance of cost basis at usual rate of 10%.	
			Year's Charge to Revenue Account.	— or + Divergence from Output.	Year's charge to Revenue Account.	— or + Divergence from Output.
	UNITS.		£		£	
1st year.	10	9%	**9·5**	— *·5*	10	·
2nd ,,	11	·	**9·5**	— *1·5*	9	— 2
3rd ,,	11	·	**9·5**	— *1·5*	8·1	— *2·9*
4th ,,	11	·	**9·5**	— *1·5*	7·3	— *3·7*
5th ,,	10	9%	**9·5**	— *·5*	6·6	— *3·4*
6th ,,	10	9%	**9·5**	— *·5*	5·9	— *4·1*
7th ,,	9	18%	**9·5**	+ *·5*	5·3	— *3·7*
8th ,,	8	27%	**9·5**	+ *1·5*	4·8	— *3·2*
9th ,,	8	27%	**9·5**	+ *1·5*	4·3	— *3·7*
10th ,,	7	36%	**9·5**	+ *2·5*	33·7	+*26·7*
Total quantity of output.	Units **95**		Usable Value. **95**	*Total error.* *12*	Usable Value. 95	*Total error.* *53·4*
			Scrap Value. **5**		Scrap Value. 5	
			£100		**£100**	

NO

The curve exhibited by the proportion receivable annually of the whole-life output (or usefulness)
less, than is shown in the first column above, headed "Estimated proportion, &c." Whenever the output (or
industrial plant is, *ipso facto*, inefficient. The efficient life period of each class of industrial plant is strictly
cannot, as a rule, be deferred from one year to another without incurring irretrievable loss; therefore, while
out of revenue receipts. Thus the fact that any class of industrial plant may not have been fully employe
which has expired during that year.

The method of distribution to annual revenue of the cost of industrial plant shown in Column A,
accounting equipment this method can be applied, in detail, to the cost of each class of plant, instead of in
expire at different periods, and thus the operation of the law of average will automatically eliminate the annual err
plant at different periods of its efficient life. Each of the methods shown in Columns B, C, D, E, and F exhibit
charged annually to revenue, and to the extent that these methods are applied, not in detail to the cost of each cla

Column D shows the effect of the use of the annuity and sinking fund methods, as between one year
fictitious annually decreasing interest, computed, but not received, under the annuity method, or adding the
d. The use of either of these methods practically prohibits the subsequent adjustment of whole-life periods

output of Industrial Plant receivable annually, in arged annually to Revenue under various methods of

Total Output ... 95 units
Usable Value .. £95
ue £5

ps of Distributing Cost to Annual Revenue Accounts.

C educing balance of cost s at effectual rate of 25%.		D Annuity or Sinking Fund basis (*See* third note at foot).		E Cost of renewals basis.		F Occasional annual allocation out of surplus revenue receipts basis.	
r's Charge Revenue Account.	— or + Divergence from Output.	Year's Charge to Revenue Account.	— or + Divergence from Output.	Year's Charge to Revenue Account.	— or + Divergence from Output.	Year's Charge to Revenue Account.	— or + Divergence from Output.
£		£		£		£	
25	*+15*	8·7	*— 1·3*	·	*—10*	·	*—10*
18·8	*+ 7·8*	9	*— 2*	·	*—11*	·	*—11*
14·2	*+ 3·2*	9·2	*— 1·8*	·	*—11*	20	*+ 9*
10·6	*— ·4*	9·5	*— 1·5*	·	*—11*	·	*—11*
7·9	*— 2·1*	9·8	*— ·2*	·	*—10*	·	*—10*
5·9	*— 4·1*	10·1	*+ ·1*	·	*—10*	·	*—10*
4·6	*— 4·4*	10·4	*+ 1·4*	·	*— 9*	30	*+21*
3·4	*— 4·6*	10·8	*+ 2·8*	·	*— 8*	·	*— 8*
2·6	*— 5·4*	11·1	*+ 3·1*	·	*— 8*	·	*— 8*
2	*— 5*	6·4	*— ·6*	95	*+88*	45	*+38*
e. 95	*Total error.* *52*	Usable Value. 95	*Total error.* *14·8*	Usable Value. 95	*Total error.* *176*	Usable Value 95	*Total error.* *136*
p e. 5		Scrap Value 5		crap Value. 5		Scrap Value. 5	
£100		£100		£100		£100	

TES.

f any class of industrial plant, whatever its nature or length of efficient life, is never greater, and is generally
usefulness) of any class of industrial plant is equal to only 64% (100 – 36%) of its highest capacity that class of
mited, owing to the natural process of decay and the advance of obsolescence, and, consequently, its full employment
ndustrial plant exists in a state of efficiency, its constantly expiring cost must be refunded by regular instalments
d during any year is no good reason for omitting to charge the revenue account with the capital outlay thereon

ded "Original cost basis," should be adopted in preference to either of the other methods, and by the use of suitable
al to the capital outlay as a whole. The efficient life of each class of plant, and of the units comprising each class,
r which would otherwise exist, due to the difference in the annual output (or usefulness) of each class of industrial
s a large annual divergence between the annual output (or usefulness) of the plant and the proportion of the cost
s of plant, but to the capital outlay as a whole, the beneficial operation of the law of average is lost.
another, in distributing the cost over any period, after adjusting the *apparent* equal annual provision by deducti
nnually increasing interest received, but omitted from both sides of the Revenue account, under the sinking f
which may be necessary to meet unexpected changing conditions.

TABLE SHOWING AMO

per cent. of original cost written off in each

NT OF DEPRECIATION

year on the reducing balance of cost basis.

TABLE SHOWING

per cent. of original cost remaining at the end o

SURVIVING VALUE

each year on the reducing balance of cost basis.

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